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SEPTEMBER 1989
VOLUME 8, NUMBER 5

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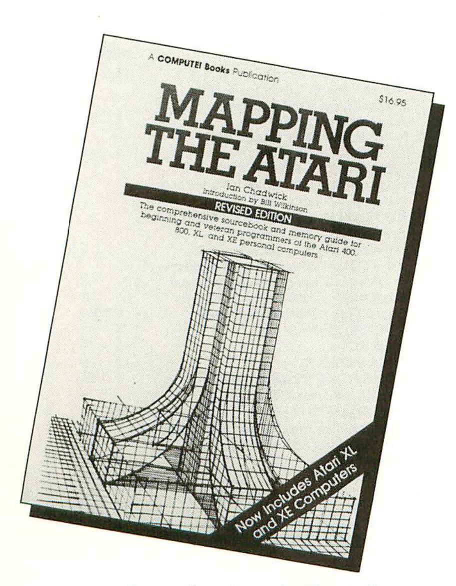




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BRAND NEW ITEMS

$\$199^{95}$ The "BLACK BOX"!© $\$199^{95}$

The **Black Box** is a device for your XL or 130XE computer that adds tremendous power to your 8-bit Atari. It has two buttons, two switches, and a set of dip switches visible from the outside. It plugs directly into the back of the 600XL, 800XL, and 1330XE computers. Custom cases may be an optional expense. The **Black Box** performs three main tasks: interface to a SASI/SCSI bus device (hard disks), Parallel printer port, and a RS232 port. A fourth option, available soon, will be a floppy disk port, especially useful to XF-551 owners. The SASI/SCSI port provides the necessary signals for hooking up most common hard disks. You may partition your hard disk into as many drives as you wish; up to 9 can be accessed at at time. By pressing one of the buttons on the **Black Box**, you will enter the configuration menu, where you can re-assign drive numbers, etc. When you exit, you will be right back in the program you were running when the switch was pressed. Each hard disk can be write-protected. The Parallel Printer port will allow you to hook up any printer that uses the standard Centronics interface. As an option, you can use the computer's extra memory as a printer buffer, or order the **Black Box** with 64K of on-board RAM. You may assign printer number and line-feed options within the menu (for use with multiple printers). Another amazing feature of the **Black Box** is the built-in screen dump. By pressing a button (on the box), the contents of your screen will be dumped to your printer (you can define text or graphics modes with a switch)! The RS232 port supplies the full RS232 spec signals for connection to a modem, or another machine (for null-modeming). The handler for the **Black Box**' s modem port is built in and takes up NO memory! The port handles rates up to TRUE 19.2K BAUD! A future upgrade for the **Black Box** is a floppy disk interface board. This will allow the addition of up to four 5.25" or 3.5" mixtures of floppy drives to be used with the system. The drives will act like standard single/enhanced/double density disk drives, but MUCH faster! All drives will be Super Archiver compatible, and support up to 2 sides of 80 tracks. Along with this hardware upgrade will come software capable of reading, writing, and formatting disks in IBM's MS-DOS format and the Atari ST format, and allow you to transfer files between those disk formats and the Atari's format. In addition , a machine language monitor has been added to allow display, byte, and register changes. Black Box price is $199.95 for the basic unit and $249.95 with 64K of RAM (for printer spooler) plus $8 for S/H/I.

$\$199^{95}$ The "MULTIPLEXER"!© $\$199^{95}$

This device brings the power and flexibility of larger systems to your 8-bit. The **Multiplexer** is a device (actually a collection of modules) that allow up to 8 Ataris to read and write to the same drive (typically a hard disk), printer, and talk to each other. One 'master' computer (any 8-bit) is equipped with the master **Multiplexer** interface. Then up to 8 'slave' computers can hook up to the master, each having their own slave interface. The 'common' peripherals (things that are to be shared) are connected to the master computer. On each slave, all disk and printer I/O is routed through the master, so no drives are needed on them. The master computer can be configured in any manner you wish - you can for example have certain peripherals 'local' to the slave, or routed to a different number on the master. Under development is a BBS system that will make full use of this device, allow ing up to 8 lines/users to be using the system at the same time! A mutiuser chat mode is a feature of this program, however, you do not NEED this program to run a BBS with the **Multiplexer** (but be warned that not all BBS programs will run concurrently). All slaves are independent, and do not need to have the same program running on them. This system is excellent for BBS SysOps, because you can be using your hard disk(s) while still running your BBS uninterrupted! Another example is in a classroom situation, or anywhere a disk needs to be shared by different people. This is an EXCELLENT programming/debugging tool as well! The **Multiplexer** price is $199.95 for a master and two slave units (plus $5 S/H/I). Additional slave units are $69.95 each.

$\$149^{95}$ The "SUPER E-BURNER"!© $\$149^{95}$

This device plugs into your Atari's cartridge port, allowing you to program PROMs or EPROMs. (EPROM stands for Erasable Programmable Read-Only Memory.) A PROM is a type of integrated circuit that will store information permanently. This is what is used in cartridges, and even in the computer to hold the operating system program. The **'Super E-Burner'** will program the following chips: 2732, 2764, 27128, 27256, and 27512 PROMs/EPROMs, with any suffix. The burner will let you make multiple copies, read data, burn from a file, etc, but does so EXTREMELY fast! It can fully burn and verify a 27128 in 15 seconds. Also under development is a gang-burner module for the **'Super E-Burner'**, allowing it to program up to 8-chips at a time, with this same insanely-fast speed! The **'Super E-Burner'** sells for $149.95. A deluxe version capable of programming 1 MEG EPROMs is available for $179.95. Add $5 for S/H/I

$\$99^{95}$ The "POWER PLUS"!© MEMORY UPGRADE $\$99^{95}$

(for 800XL'S and 130XE's only)

C.S.S has made the **'Power Plus'!** memory upgrades available on an 'unadvertised' basis to our regular patrons. These upgrades have become so popular we are now making them available to everyone! For those of you unfamiliar with **'Power Plus'!** upgrade, it is the most COMPATABLE upgrade available for the 800XL or 130 XE. All other upgrade kits have some degree of INCOMPATABILITY with certain software programs. C.S.S. studied this problem and developed the **POWER PLUS** upgrade which, to the best of our knowledge, appears to be 100% compatible. To upgrade a 130XE to 320K is only $99.95. To upgrade a 800XL to 320K is only $149.95 plus (circuitry from a 130XE is actually transplanted into an 800XL!). Add $5 for S/H/I C.S.S. will install these upgrades for only $20 if you wish.

$\$39^{95}$ The SIO "POWER BOOSTER"!© $\$39^{95}$

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BEST SELLERS

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(for ATARI 1050 drives)

NOW! COPIES all **ENHANCED DENSITY** programs plus retains all of the features of our World Famous **SUPER ARCHIVER!** (see below). Allows you to **COPY** or **CREATE** single or **ENHANCED** density protection schemes (including **PHANTOM SECTORS!**). Completely automatic; compatible with the **BIT-WRITER !**; the **ULTIMATE BACKUP/PROGRAMMING** device! Only $99.95 plus $4 S/H/I. **NOTICE!** If you already own a **SUPER ARCHIVER!**, you can upgrade to a **SUPER ARCHIVER II** for only $29.95 plus $5 S/H/I (disk only-no additional hardware required).

$\$69^{95}$ The "SUPER ARCHIVER"!© $\$69^{95}$

(forATARI 1050 drives)

The new **SUPER ARCHIVER**, obsoletes all copying devices currently available for the **ATARI 1050!** It eliminates the need for Patches, **PDB** files, Computer Hardware, etc. Copies are exact duplicates of originals and will run on any drive; without exaggeration, the **SUPER ARCHIVER** is the most powerful **PROGRAMMING/COPYING** device available for the 1050! Installation consists of a plug-in chip and 6 simple solder connections. Software included. Features are:

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$\$149^{95}$ "ULTRA SPEED PLUS" $\$149^{95}$

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LIMITED SPECIALS

These specials are available on a first come first served basis. Pre-owned items are in exceptionally clean condition and are in perfect operating order. All items are warrantied. Sorry ... no rainchecks. Order 5 or more items and we'll pay the freight. These SPECIALS are for C.S.S. customers only - NO DEALER DISCOUNTS! Add $5 to order for S/H/I.

	NORMALLY	LIMITED SPECIAL
1. SIO Cable (Standard)	$ 15	$ 5
2. Generic Power Supply for XL/XE computers (5 v.DC regulated - also ± 12 v available)	$ 35	$ 12
3. EXTRA HEAVY DUTY version of GENERIC POWER SUPPLY	$ 45	$ 19
4. 130XE with 320K POWER PLUS upgrade and Ultra Speed Plus installed (with power supply and cable)		$ 250
5. 1050 DISK DRIVES with SUPER ARCHIVER II and SILENCER installed (with power supply and cable)		$ 250
6. 20 MEG hard Drives complete! just plug in and turn on! No extras to purchase! Surplus industrial 8" originally sold for over $2000. Super dependable!	$ 2500	$ 595
7. SUPER PILL (without case)	$ 80	$ 22
8. XL FIX ROM	$ 70	$ 29
9. ULTRA MENU/DOS	$ 30	$ 19
10. DISKCRACKER (Newest version)	$ 50	$ 19
11. ELECTRONIC PHANTOM SECTOR MAKER DELUXE	$ 60	$ 35
12. MIRACLE (Disk only Version of Impossible)	$ 70	$ 19
13. IMPOSSIBLE for 800 or 800XL	$ 150	$ 69
14. XL MATE	$ 30	$ 15
15. COMPACTOR	$ 30	$ 15
16. KLONE II (Generic HAPPY Backup)	$ 100	$ 75
17. SILENCER	$ 30	$ 19
18. BLACK PATCH (MASTER)	$ 50	$ 25
19. BLACK PATCH DATA DISKS 1&2	$ 20	$ 10

REPAIRS

For 24-48 hour repair service on Atari computers or drives, call our repair department at (716) 586-5545 day or night. All work is guaranteed, NO minimum estimate fees; If you have two or more items for repair and don't want to spend any money .... send them to us and we'll use the parts from both defective items to make one good working unit at NO CHARGE ... we'll keep the other defective item for parts!



I'm pleased to tell you that contrary to some mistaken rumors which seem to be going around, **Antic** Magazine is still being published *monthy* and absolutely has not cut back to six times a year! Anything different that you may have heard via word of mouth or online is simply untrue.

Some confusion seems to have resulted from a recent **Antic** policy change which was explained in a mailing to all subscribers and is also reflected in the magazine's current subscription ads. As of July 1989, the only kind of **Antic** subscription being offered is a six-month magazine-plus-disk combination for only $28—the same price as the previous 12-month magazine-only subscription. To simplify this changeover, existing subscribers were converted to six-month magazine-plus-disk subscriptions (with bonus issues, if applicable).

However, in our eighth year of reliable service to the 8-bit Atari community, **Antic** continues publishing 12 times yearly. The new $28 six-month magazine-plus-disk subscription is simply the best value we have ever offered to Atarians. Now each month you get a two-sided disk crammed full of useful and entertaining software, along with the best ongoing source of valuable Atari information, at a price that anybody can afford.

Nat Friedland

Nat Friedland
Editor, **Antic**

I/O BOARD

NEW TO DOS

As a relative newcomer to the world of Atari, I'd like to know more about the various types of DOS I keep hearing about—SmartDOS, TopDOS, MyDOS, etc. Is there any article available that discusses their relative merits?

Also, has there been an article which would introduce a novice such as myself to a RAMdisk? The 800XL I purchased has a 256K RAMdisk installed, but I don't know how to access it.

Rudolph Kraus
Fayette, IA

*For a DOS overview, our most comprehensive comparison article is Eric Clausen's **Everything You Wanted to Know About DOS** in the July 1985 issue. Unfortunately, some of the programs listed in the article are no longer available, and some super new disk operating systems have come out since. The latest two contenders, SpartaDOS X and DOS XE are discussed at length in the March, 1989 **Antic**.*

***SmartRAM 2.5**, in this issue, provides a RAMdisk that should work with most 800XL upgrades and DOS 2.5. RAMdisks are largely used as "temporary" disk drives. To save a file to a RAMdisk, you simply address the drive as D8:, rather than the usual D1: or D2:. Because the RAMdisk is actually part of the computer's internal memory, saving or loading files to RAM is much faster than using an external drive. If you have only one drive, the RAMdisk can act as a second drive, making it possible to copy files without disk swapping.*

The drawback to a RAMdisk is that it goes away when the power does—if you forget to save your RAMdisk files to an actual floppy disk before pressing [RESET] or turning off the computer, you lose them forever.—ANTIC ED

MORE MONITOR MADNESS

Is it possible to hook up my Atari 800 to my Atari SC1224 monitor? For that matter, is it possible to hook up a VCR to my SC1224?

Franco Simanjuntak
Oakland, CA

The Atari ST's SC1224 monitor does not use composite signals, which the 8-bit requires. For the VCR, it's not the monitor you have to worry about, it's the sort of signal your computer is sending. Since the 8-bits use the same signal as the TV, you can hook up your 800 up to a VCR. For an ST, a VideoKey is usually required to translate the signal. — ANTIC ED

SHUTDOWN RESTARTED

I noticed after a few levels of *Shutdown* in the April, 1989 issue that an elevator which should take you to the bottom level of the screen actually takes you even further, causing a "Cursor out of bounds" error. At first I thought Tony was using this as an entrance to his other fine game, *Escape from Hell* (June, 1988), but upon examining the code, found that the middle of line 4505 should be changed from -@@- to -/@- because the / indicates a stop for the elevator.

Craig Anderson
Indianapolis, IN

MONOCHROME MONITOR?

I have an Atari XEGS computer and would like to know if I have to use a color monitor with it, or could use a monochrome monitor. Would I be able to use an Atari XEP80 card with the XEGS using a television, or do I have to use a monitor?

Richard Williams
Cleveland, OH

If you don't want to use a TV for a monitor, you can use a color composite monitor (but not the RGB monitors used with the ST, for example). Composite monochrome monitors are not that easy to find today, but they give you the best results with the XEP80. Most 8-bit software is designed for color monitors, so you may find monochrome a bit limiting. A good color monitor will provide better resolution and less artifacting (color smearing) than a television set—and give you considerable control over tint and color intensities.—ANTIC ED

TRICKY TEXT ADVENTURE

I read your *Adventure Works* article in the April, 1989 **Antic**, but I can't get the game *Barnaby's Isle* to work. I keep getting pushed back by the troll. Also, the article has a misprint on page 30—it says lines 205 to 207 contain the USE routine, but there's no line 207. Help!

Martin Oliverez
San Jose, CA

The game is working, all right, but there's an object you need to "USE" at the point just before you meet the troll. (Line 205 should make the object required quite clear, as a matter of fact.) Lines 205 through 227 contain the various results you get with USE. Usually, text adventures are encrypted so you can't "read" the answers in the program, but this sample adventure should be easy to solve if you just scan the listing itself for clues.—ANTIC ED

SIDEWAYS PRINT

In Larry Whiting's June, 1989 I/O letter, he described problems printing sideways on his Atari XMM801 printer. My company, Starfleet Software, writes and sells software to fill in the gaps between all the Epson-compatible software and the needs of the XMM801.

Our Utility Disk #4 for the Atari XMM801 printer contains a utility for printing SynCalc-format files sideways. The cost is $10 paid by money order or check made out to Terry Ortman. Users may browse our online catalog by calling our BBS at (217) 423-7430, 24 hours a day, 300/1200 baud operation.

Terry Ortman
1037 W. Leafland Ave.
Decatur, IL 62522

SETTING TRAPS

I have been having difficulty using the TRAP statement on my Atari 130XE. I never encountered this command in my BASIC programming course, and would like more information on how to use it.

John Mitchell
Cambridge City, IN

The TRAP statement is a way of telling the computer, "If there's an error, let the program handle it, at this line." Using TRAP statements is vital to error-proofing a program. For a detailed discussion, check out Heidi Brumbaugh's Error Trapping in Atari BASIC *in the February, 1989 issue of **Antic**. Back Issues are available.*—ANTIC ED

LIKE CHRISTMAS

We just bought our first issue of **Antic**. It was like Christmas! We suddenly felt like kids in a candy store. With very little software available locally, Antic was like an oasis in an area we thought had all but dried up! Thanks to Antic we can still get software for our beloved 800XL and 1050 drive—we sent for a subscription right away. Thank you for letting us know that we aren't the only loyal Atari users out there.

Pam Baweja
Grand Rapids, MI

*Thanks. It's enthusiastic Atari 8-bit fans like you who keep **Antic** going.* — ANTIC ED

Antic welcomes your feedback, but we regret that the large volume of mail makes it impossible for the Editors to reply to everyone. Although we do respond to as much reader correspondence as time permits, our highest priority must be to publish I/O answers to questions that are meaningful to a substantial number of readers.

Send letters to: Antic I/O Board, 544 Second Street, San Francisco, CA 94107.

MAPPER

(applications software)
Michael Holloway
3308 Rucker Avenue
Paducah, KY 42001
(502) 442-2121
$16.50, 48K disk

Print maps on your Epson-compatible printer with **Mapper**. This BASIC program contains pre-drawn maps showing all major parts of the world, along with a world reference guide listing capitals, population, languages and more. Maps can be printed in several sizes and in inverse. The standard version of Mapper uses DOS 2.5, but SpartaDOS and Turbo-BASIC versions are available.

SLEUTH & CSS DISASSEMBLER

(utilities)
Creative Sortware Systems
8715 Valley View #3
Berrien Springs, MI 49103
(616) 471-3745

From Creative Software Systems, the **Sleuth** ($15.95, 48K) disk utility package features a sector editor, file copier and two sector copiers. The package supports most DOS functions including directory (sorted and/or printed), lock, unlock, rename, delete and format. Other functions include verify, for repairing damaged files, close and undelete. Fully menu-driven and easy to use, the utilities work with single or enhanced density.

The self-documenting **CSS Disassembler** ($5.95, 48K disk) will disassemble from memory, disk file or a specified sector. You can insert comments on key memory locations, and send the disassembled listing to a printer or disk file. Versions for both the 400/800 and XL/XE are included, and work with either single or enhanced density. Two page-preview programs give you either a high resolution, full-page preview, or an 80-column preview.

CHANGING PATTERNS

(entertainment/art software)
Stewart Software
11323 Blythe Street
Sun Valley, CA 91352
(213) 875-2012
$49 (four disks), 48K, color monitor, 2 disk drives recommended

No drawing is required to create art on your 8-bit with **Changing Patterns**, from Los Angeles artist John Stewart. Use keyboard or joystick control to enter a set of parameters, then sit back and watch as the computer generates art. The generated art can be saved to disk or printed out—as either image or formula. The resulting images can be abstract, surreal, medieval, geometric, ornamental, woven, beaded, or in art nouveau style. Limited only by your imagination, Changing Patterns can create millions of images or decorative designs for use in crafts.

VIDEO LIGHT GUN

(hardware)
Best Electronics
2021 The Alameda, Suite 290
San Jose, CA 95126
(408) 243-6950
$34.95, 48K

Play the latest light gun cartridge games on your 8-bit Atari with the **Video Light Gun** from Best Electronics. This gun features an adjustable gun sight and a nine-foot cord. Fully compatible with all current Atari light gun software, the gun works with television sets or composite color monitors.

MAP DISKS 3 & 4

(graphics)
N.E.R.D.S. Software
c/o Don Loeffler
18 Wendy Drive
Farmingville, NY 11738
$16 for both disks, 48K

Map Disks 3 & 4 are now available from the National Educational Report Drawing Services (N.E.R.D.S.). Designed for use with Broderbund's Print Shop program, these disks provide over 230 pictures of Russia, China, Africa, Asia and the Middle East. Particularly useful for school reports, these disks are available in multiple-copy Lab Packs for school use (send SASE for details).

Other disks still available from N.E.R.D.S. include Maps 1 & 2 ($15 for both), Biology Disks 1 & 2 ($15 for both) and the Periodic Table ($9). These disks are available in Quick Pix conversions for use with AtariWriter or PaperClip. (Quick Pix conversions are *not* available for Map Disks 3 & 4.)

*New Products notices are compiled by the **Antic** staff from information provided by the products' manufacturers. Antic welcomes such submissions, but assumes no responsibility for the accuracy of these notices or the performance of the products listed.*

COMING NEXT IN OCTOBER 1989 ANTIC

Antic Music Sampler— Build your own sound collector

Text Adventure— Contest Winners

AtariWriter 80 Review

SFP: Easier Reports From SynFile+

Makes the top 8-bit database even better

Reviewed by Steve Fishbein

Having remained faithful to SynFile+ as my database of choice on the Atari 8-bit computer, I look forward to any utilities that can improve an already excellent program. So, I was intrigued by the **Antic** New Product listing of a new utility for SynFile+, Donald Seay's **SFP**.

One of SynFile+'s greatest weaknesses has been its inability to save any of the report parameters. Generating a report requires opening the file, setting up the report parameters, printing, and then closing the file. The entire process must be repeated each time you want to print a report.

Now, SFP sets up permanent report parameters so data can be reprinted in identical format each time. In addition, different parameters can be saved for the same file. Each report format requires only one block of disk space. SFP can also generate these reports directly from the file on the data disk. This eliminates the need to start up and exit the SynFile+ program!

SFP consists of four modules. The Menu provides access to the other modules and lets you change some program parameters. The Utility module lists the structure of the files. The

SFP sets up permanent report parameters.

Report module lets you create, save, list and modify reports and the Generate module produces the reports and labels.

The program comes with DOS 2.5 and allows for a RAMdisk to be set up on boot-up. Unlike SynFile+, SFP will work with a data disk in Drive 2. Double density data disks may also be used with SFP, but you must use a DOS that supports double density. Drive 2 can be set as single density and Drive 3 as double density, eliminating a need to change density for any data file.

Seay's program has several features that make it a good value. Using SFP, you can display or print the structure of a SynFile+ file. The structure display includes indices, formulae and look-up tables. You can also alter values associated with record numbers and counter fields; modify look-up tables, adding, changing or deleting values; change true/false texts to conditional items; change the justification of a data item; and even recover deleted records (under certain circumstances).

If you ever had to swap disks repeatedly when printing reports from large databases, you'll want SFP simply because it reduces swaps by printing the contents in sequence by disk. Also useful, the Page Wait option allows printing onto stationery (or other single-sheet paper).

I did have one problem when I first tried to use the program. The instructions were unclear as to which files needed to be opened, created or modified. Some further explanation in the manual would have been useful.

I used to avoid using SynFile+ for mailing labels because of the inconvenience of having to open the program, set the print parameters for labels and only then, finally print labels. With SFP, I will undoubtedly be re-doing my mailing lists with SynFile+. ▲

$21.95. (Virginia residents add 90 cents sales tax.) SFP, 4 Forest Drive, Palmyra, VA 22963-2118.

Mapping the Atari

PART 2

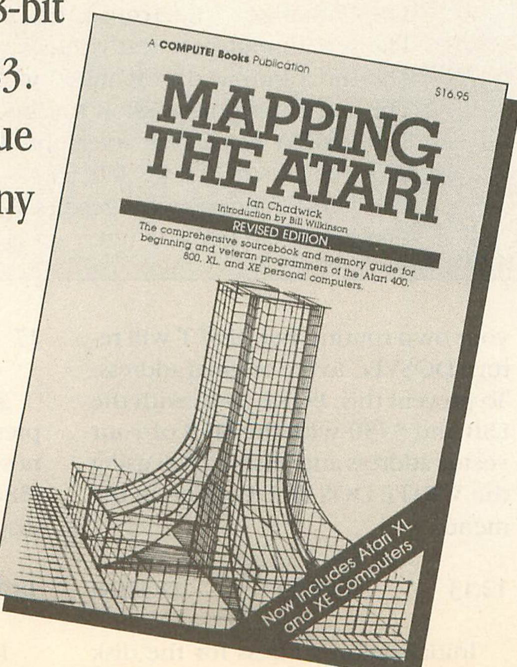
Exclusive!

Classic 8-bit reference book returns.

By Ian Chadwick

Antic continues the exclusive serialization of key excerpts from the revised second edition of Ian Chadwick's "Mapping the Atari." Virtually impossible to obtain today, this book has been one of the key reference sources for Atari 8-bit programmers since 1983.

The August 1989 issue of **Antic** explained many of the uses for a comprehensive Atari memory location guide—which we now begin presenting this month.



Locations zero to 255 ($0 to $FF) are called "page zero" and have special importance for assembly language programmers since these locations are accessed faster and easier by the machine.

Locations zero to 127 ($0 to $7F) are reserved as the OS page zero, while 128 to 255 ($80 to $FF) are the BASIC and the user zero page RAM. Locations zero to 1792 ($0 to $700) are all used as the OS and (if the cartridge is present) 8K BASIC RAM (except page six). Locations zero to 8191 ($0 to $1FFF) are the minimum required for operation (8K).

Locations two through seven are not cleared on any start operation.

DECIMAL	HEX	LABEL
0,1	0,1	LINZBS

LINBUG RAM, replaced by the monitor RAM. It seems to be used to store the VBLANK timer value. One user application I've seen for location zero is in a metronome program in De Re Atari. Also used in cross-assembling the Atari OS.

2,3	2,3	CASINI

Cassette initialization vector: JSR through here if the cassette boot was successful. This address is extracted from the first six bytes of a cassette boot file.

4,5	4,5	RAMLO

RAM pointer for the memory test used on powerup. Also used to store the disk boot address—normally 1798 ($706)—for the boot continuation routine.

6	6	TRAMSZ

Temporary Register for RAM size; used during powerup sequence to test RAM availability. This value is then moved to RAMTOP, location 106 ($6A). Reads one when the BASIC or the A (left) cartridge is plugged in.

7	7	TSTDAT

RAM test data register. Reads one when the B or the right cartridge is inserted.

RAMLO, TRAMSZ and TSTDAT are all used in testing the RAM size on powerup. On DOS boot, RAMLO and TRAMSZ also act as temporary storage for the boot continuation address. TRAMSZ and TSTDAT are used later to flag whether or not the A (left) and/or B (right) cartridges, respectively, are plugged in (non-zero equals cartridge plugged in) and whether the disk is to be booted.

Locations eight through 15 ($8-$F) are cleared on coldstart only.

8	8	WARMST

Warmstart flag. If the location reads zero, then it is in the middle of powerup; 255 is the normal RESET status. Warmstart is similar to pressing RESET, so should not wipe out memory, variables, or programs.

9	9	BOOT?

Boot flag success indicator. A value of 255 in this location will cause the system to lockup if RESET is pressed. If BOOT? reads one, then the disk boot was successful; if it reads two, then the cassette boot was successful.

10,11	A,B	DOSVEC

Start vector for disk (or non-cartridge) software. This is the address BASIC jumps to when you call up DOS. Can be set by user to point to your own routine, but RESET will return DOSVEC to the original address. To prevent this, POKE 5446 with the LSB and 5450 with the MSB of your vector address and re-save DOS using the WRITE DOS FILES option in the menu.

12,13	C,D	DOSINI

Initialization address for the disk boot. Also used to store the cassette-boot RUN address, which is then moved to CASINI (2,3). When you powerup without either the disk or an autoboot cassette tape, DOSINI will read zero in both locations.

14,15	E,F	APPMHI

Applications memory high limit and pointer to the end of your BASIC program, used by both the OS and BASIC. It contains the lowest address you can use to set up a screen and Display List (which is also the highest address usable for programs and data below which the diaplay RAM may not be placed).

16	10	POKMSK

POKEY interrupts: the IRQ service uses and alters this location. Shadow for 53774 ($D20E). POKE with 112 ($70; also POKE this same value into 53774) to disable the BREAK key. If the following bits are set (to one), then these interrupts are enabled (bit decimal values are in parentheses):

BIT	DECIMAL	FUNCTION
7	128	The BREAK key is enabled.
6	64	The ''other key'' interrupt is enabled.
5	32	The serial input data ready interrupt is enabled.
4	16	The serial output data required interrupt is enabled.
3	8	The serial out transmission finished interrupt is enabled.
2	4	The POKEY timer four interrupt is enabled (only in the ''B'' or later versions of the OS ROMs).
1	2	The POKEY timer two interrupt is enabled.
0	1	The POKEY timer one interrupt is enabled.

17	11	BRKKEY

Zero means the BREAK key is pressed; any other number means it's not. A BREAK during I/O returns 128 ($80). Monitored by both keyboard, display, cassette and screen handlers.

18,19,20	12,13,14	RTCLOK

Internal realtime clock. Location

20 increments every stage one VBLANK interrupt (1/60 second = one jiffy) until it reaches 255 ($FF); then location 19 is incremented by one and 20 is reset to zero (every 4.27 seconds). When location 19 reaches 255, it and 20 are reset to zero and location 18 is incremented by one (every 18.2 minutes or 65536 TV frames).

21,22 15,16 BUFADR

Indirect buffer address register (page zero). Temporary pointer to the current disk buffer.

23 17 ICCOMT

Command for CIO vector. Stores the CIO command; used to find the offset in the command table for the correct vector to the handler routine.

24,25 18,19 DSKFMS

Disk file manager pointer. Called JMPTBL by DOS; used as vector to FMS.

26,27 1A,1B DSKUTL

The disk utilities pointer. Called BUFADR by DOS, it points to the area saved for a buffer for the utilities package (data buffer; DBUF) or for the program area (MEMLO; 743, 744; $2E7, $2E8).

28 1C PTIMOT

Printer timeout, called every printer status request. Initialized to 30, which represents 32 seconds (the value is 64 seconds per 60 increments in this register); typical timeout for the Atari 825 printer is five seconds. The value is set by your printer handler software. It is updated after each printer status request operation. It gets the specific timeout status from location 748 ($2EC), which is loaded there by SIO.

29 1D PBPNT

Print buffer pointer; points to the current position (byte) in the print buffer. Ranges from zero to the value in location 30.

30 1E PBUFSZ

Print buffer size of printer record for current mode. Normal buffer size and line size equals 40 bytes; double-width print equals 20 bytes (most printers use their own control codes for expanded print); sideways printing equals 29 bytes (Atari 820 printer only). Printer status request equals four. PBUFSZ is initialized to 40. The printer handler checks to see if the same value is in PBPNT and, if so, sends the contents of the buffer to the printer.

31 1F PTEMP

Temporary register used by the printer handler for the value of the character being output to the printer.

THE ZIOCB

Locations 32 to 47 ($20 to $2F) are the ZIOCB: Page zero Input-Output control Block. They use the same structure as the IOCB's at locations 832 to 959 ($340 to $3BF). The ZIOCB is used to communicate I/O control data between CIO and the device handlers. When a CIO operation is initiated, the information stored in the IOCB channel is moved here for use by the CIO routines. When the operation is finished, the updated information is returned to the user area.

32 20 ICHIDZ

Handler index number. Set by the OS as an index to the device name table for the currently open file. If no file is open on this IOCB (IOCB free), then this register is set to 255 ($FF).

33 21 ICDNOZ

Device number or drive number. Called MAXDEV by DOS to indicate the maximum number of devices. Initialized to one.

34 22 ICCOMZ

Command code byte set by the user to define how the rest of the IOCB is formatted, and what I/O action is to be performed.

35 23 ICSTAZ

Status of the last IOCB action returned by the device, set by the OS. May or may not be th same status returned by the STATUS command.

36,37 24,25 ICBALZ/HZ

Buffer address for data transfer or the address of the file name for commands such as OPEN, STATUS, etc.

38,39 26,27 ICPTLZ/HZ

Put byte routine address set by the OS. It is the address minus one byte of the device's ''put one byte'' routine. It points to CIO's ''IOCB not OPEN'' on a CLOSE statement.

40,41 28,29 ICBLLZ/HZ

Buffer length byte count used for PUT and GET operations; decreased by one for each byte transferred.

42 2A ICAX1Z

Auxiliary information first byte used in OPEN to specify the type of file access needed.

43 2B ICAX2Z

CIO working variables, also used by some serial port functions. Auxiliary information second byte.

44,45 2C,2D ICAX3Z/4Z

Used by BASIC NOTE and POINT

commands for the transfer of disk sector numbers. These next four bytes to location 47 are also labelled as: ICSPRZ and are defined as spare bytes for local CIO use.

46 2E ICAX5Z

The byte being accessed within the sector noted in locations 44 and 45. It is also used for the IOCB Number multiplied by 16. Each IOCB block is 16 bytes long. Other sources indicate that the 6502 X register also contains this information.

47 2F ICAX6Z

Spare byte. Also labelled CIOCHR, it is the temporary storage for the character byte in the current PUT operation.

48 30 STATUS

Internal status storage. The SIO routines in ROM use this byte to store the status of the current SIO operation.

49 31 CHKSUM

Data frame checksum used by SIO: single byte sum with carry to the least significant bit. Checksum is the value of the number of bytes transmitted (255; $FF). When the number of transmitted bytes equals the checksum, a checksum sent flag is set at location 59 ($3B). Uses locations 53773 ($D20D) and 56 ($38) for comparison of values (bytes transmitted).

50,51 32,33 BUFRL/HI

Pointer to the data buffer, the contents of which are transmitted during an I/O operation, used by SIO and the Device Control Block (DCB); points to the byte to send or receive. Bytes are transferred to the eight-bit parallel serial output holding register or from the input holding register at 53773 ($D20D).

52,53 34,35 BFENLO/HI

Next byte past the end of the SIO and DCB data buffer described above.

54 36 CRETRY

Number of command frame retries. Default is 13 ($0D). This is the number of times a device will attempt to carry out a command such as read a sector or format a disk.

55 37 DRETRY

Number of device retries. The default is one.

56 38 BUFRFL

Data buffer full flag (255; $FF equals full).

57 39 RECVDN

Receive done flag (255; $FF equals done).

58 3A XMTDON

Transmission done flag (255; $FF equals done).

59 3B CHKSNT

Checksum sent flag (255; $FF equals sent).

60 3C NOCKSM

Flag for ''no checksum follows data.'' Not zero means no checksum follows; zero equals checksum follows transmission data.

61 3D BPTR

Cassette buffer pointer: record data index into the portion of data being read or written. Ranges from zero to the current value at location 650 ($28A).

62 3E FTYPE

Inter-record gap type between cassette records, copied from location 43 ($2B; ICAX2Z) in the ZIOCB, stored there from DAUX2 (779; $30B) by the user.

63 3F FEOF

Cassette end of file flag. If the value is zero, an end of file (EOF) has not been reached. Any other number means it has been detected.

64 40 FREQ

Beep count retain register. Counts the number of beeps required by the cassette handler during the OPEN command for play or record operations; one beep for play, two for record.

65 41 SOUNDR

Noisy I/O flag used by SIO to signal the beeping heard during disk and cassette I/O. POKE here with zero for blessed silence during these operations. Other numbers return the beep. Initialized to three.

66 42 CRITIC

Critical I/O region flag; defines the current operation as a time-critical section when the value here is non-zero. Checked at the NMI process after the stage one VBLANK has been processed. POKEing any number other than zero here will disable the repeat action of the keys and change the sound of the CTRL-2 buzzer.

Zero is normal; setting CRITIC to a non-zero value suspends a number of OS processes including system software timer counting (timers two, three, four and five).

67-73 43-49 FMZSPG

Disk file manager system (FMS) page zero registers (seven bytes).

67,68 43,44 ZBUFP

Page zero buffer pointer to the user filename for disk I/O.

69,70 45,46 ZDRVA

Page zero drive pointer. Copied to here from DBUFAL and DBUFAH; 4905 and 4913 ($1329, $1331). Also used in FMS ''free sector,'' setup and ''get sector'' routines.

71,72 47,48 ZSBA

Zero page sector buffer pointer.

73 49 ERRNO

Disk I/O error number. Initialized to 159 ($9F) by FMS.

74 4A CKEY

Cassette boot request flag on coldstart. Checks to see if the START key is pressed and, if so, CKEY is set.

75 4B CASSBT

Cassette boot flag. The Atari attempts both a disk and a cassette boot simultaneously. Zero here means no cassette boot was successful.

76 4C DSTAT

Display status and keyboard register used by the display handler. Also used to indicate memory is too small for the screen mode, cursor out of range error, and the BREAK abort status.

77 4D ATRACT

Attract mode timer and flag. Attract mode rotates colors on your screen at low luminance levels when the computer is on but no keyboard input is read for a long time (seven to nine minutes). This helps to save your TV screen from ''burn-out'' damage suffered from being left on and not used. It is set to zero by IRQ whenever a key is pressed, otherwise incremented every four seconds by VBLANK (see locations 18-20; $12-$14). When the value in ATRACT reaches 127 ($7F), it is then set to 254 ($FE) until attract mode is terminated. This sets the flag to reduce the luminance and rotate the colors when the Atari is sitting idle.

78 4E DRKMSK

Dark attract mask; set to 254 ($FE) for normal brightness when the attract mode is inactive (see location 77). Set to 246 ($F6) when the attract mode is active to guarantee screen color luminance will not exceed 50†. Initialized to 254 ($FE).

79 4F COLRSH

Color shift mask; attract color shifter; the color registers are EORd with locations 78 and 79 at the stage two VBLANK (see locations 18-20; $12-$14). When set to zero and location 78 equals 246, color luminance is reduced 50%. COLRSH contains the current value of location 19, therefore is given a new color value ever 4.27 seconds.

Bytes 80 to 122 ($50 to $7A) are used by the screen editor and display handler.

80 50 TEMP

Temporary register used by the display handler in moving data to and from screen. Also calll TMPCHR.

81 51 HOLD1

Same as location 80. It is used also to hold the number of Display List entries.

82 52 LMARGN

Column of the left margin of text (GR.O or text window only). Zero is the value for the left edge of the screen; LMARGN is initialized to two. You can POKE the margin locations to set them to your specific program needs, such as POKE 82,10 to make the left margin start ten locations from the edge of the screen.

83 53 RMARGN

Right margin of the text screen, initialized to 39 ($27).

84 54 ROWCRS

Current graphics or text screen cursor row, value ranging from zero to 191 ($BF) depending on the current GRAPHICS mode (maximum number of rows, minus one). This location, together with location 85 below, defines the cursor location for the next element to be read/written to the screen. Rows run horizontally, left to right across the TV screen. Row zero is the topmost line; row 192 is the maximum value for the bottom-most line.

85,86 55,56 COLCRS

Current graphics or text mode cursor column; values range from zero to 319 (high byte, for screen mode eight) depending on current GRAPHICS mode (maximum number of columns minus one). Location 86 will *always* be zero in modes zero through seven. Home position is 0,0 (upper left-hand corner). Columns run vertically from the top to the bottom down the TV screen, the leftmost column being number zero, the rightmost column the maximum value in that mode. The cursor has a complete top to bottom, left to right wraparound on the screen.

87 57 DINDEX

Display mode/current screen mode. Labelled CRMODE by (*M). DINDEX contains the number obtained from the low order four bits of most recent open AUX1 byte. It can be used to fool the OS into thinking

you are in a different GRAPHICS mode by POKEing DINDEX with a number from zero to 11. POKE with seven after you have entered GRAPHICS mode eight, and it will give you a split screen with mode seven on top and mode eight below. However, in order to use both halves of the screen, you will have to modify location 89 (below) to point to the area of the screen you wish to DRAW in.

88,89 58,59 SAVMSC

The lowest address of the screen memory, corresponding to the upper left corner of the screen (where the value at this address will be displayed). The upper left corner of the text window is stored at locations 660, 661 ($294, $295).

90 5A OLDROW

Previous graphics cursor row. Updated from location 84 ($54) before every operation. Used to determine the starting row for the DRAWTO and XIO 18 (FILL command).

91,92 5B,5C OLDCOL

Previous graphics cursor column. Updated from locations 85 and 86 ($55, $56) before every operation. These locations are used by the DRAWTO and XIO 18 (FILL) commands to determine the starting column of the DRAW or FILL.

93 5D OLDCHR

Retains the value of the character under the cursor, used to restore that character when the cursor moves.

94,95 5E,5F OLDADR

Retains the memory location of the current cursor location. Used with location 93 (above) to restore the character under the cursor when the cursor moves.

96 60 NEWROW

Point (row) to which DRAWTO and XIO 18 (FILL) will go.

97,98 61,62 NEWCOL

Point (column) to which DRAWTO and XIO 18 (FILL) will go. NEWROW and NEWCOL are initialized to the values in ROWCRS and COLCRS (84 to 86; $54 to $56) above, which represent the destination end point of the DRAW and FILL functions. This is done so that ROWCRS and COLCRS can be altered during these routines.

99 63 LOGCOL

Position of the cursor at the column in a logical line. A logical line can contain up to three physical lines, so LOGCOL can range between zero and 119. Used by the display handler.

100,101 64,65 ADRESS

Temporary storage used by the display handler for the Display List address, line buffer (583 to 622; $247 to $26E), new MEMTOP value after DL entry, row column address, DMASK value, data to the right of cursor, scroll, delete, the clear screen routine and for the screen address memory (locations 88, 89; $58, $59).

102,103 66,67 MLTTMP

Also called OPNTMP and TOADR; first byte used in OPEN as temporary storage. Also used by the display handler as temporary storage.

104,105 68,69 SAVADR

Also called FRMADR. Temporary storage, used with ADRESS above for the data under the cursor and in moving line data on the screen.

106 6A RAMTOP

RAM size, defined by powerup as passed from TRAMSZ (location 6), given in the total number of available pages (one page equals 256 bytes, so PEEK(106)*256 will tell you where the Atari thinks the last usable address—byte—of RAM is). MEMTOP (741,742; $2E5,$2E6) may not extend below this value. In a 48K Atari, RAMTOP is initialized to 160 ($A0), which points to location 40960 ($A000). The user's highest address wil be one byte less than this value.

107 6B BUFCNT

Buffer count: the screen editor current logical line size counter.

108,109 6C,6D BUFSTR

Editor low byte (AM). Display editor GETCH routine pointer (location 62867 for entry; $F593). Temporary storage; returns the character pointed to by BUFCNT above.

110 6E BITMSK

Bit mask used in bit mapping routines by the OS display handler at locations 64235 to 64305 ($FAEB to $FB31). Also used as a display handler temporary storage register.

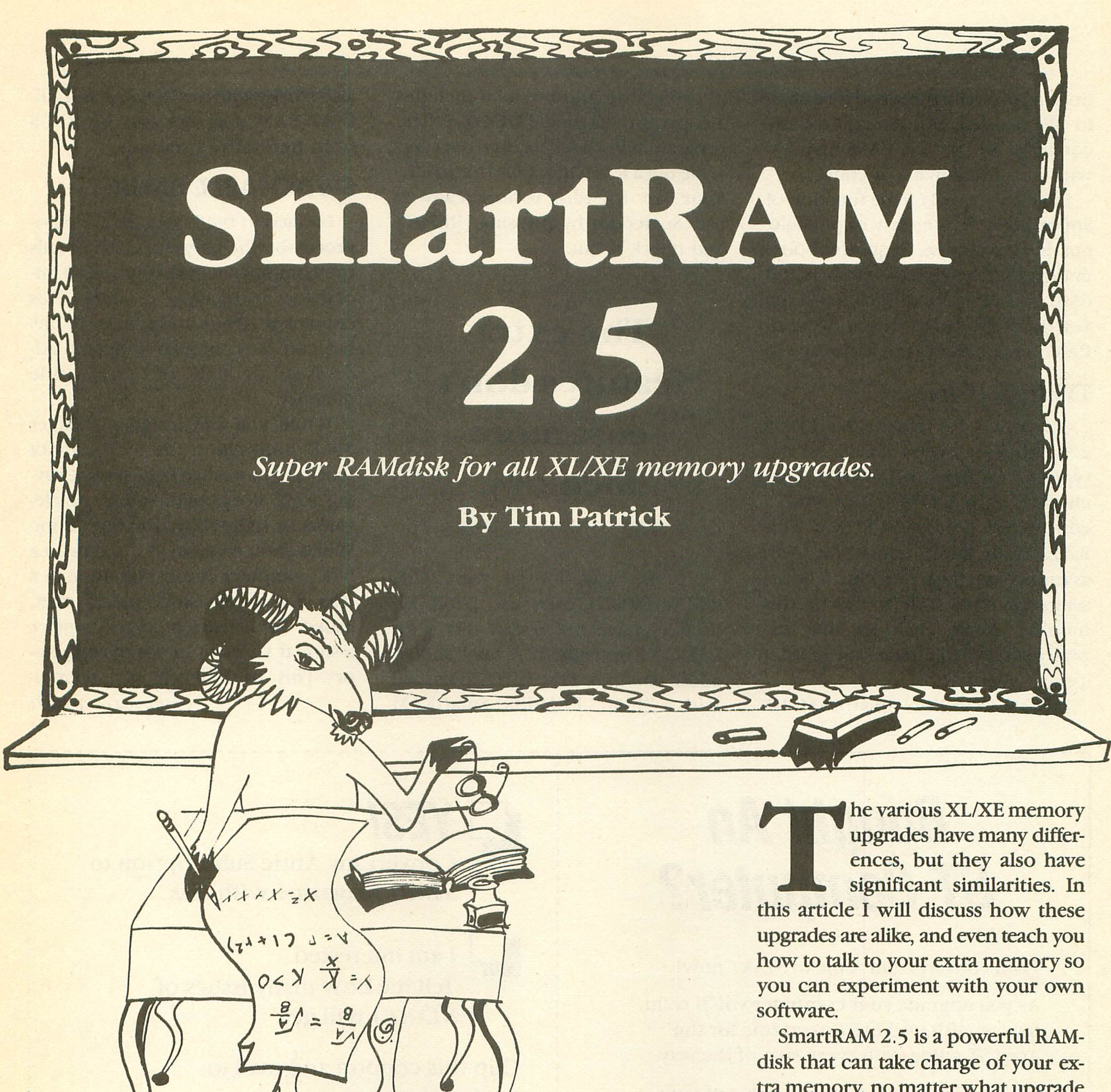
111 6F SHFAMT

Pixel justification: the amount to shift the right justified pixel data on output or the amount to shift the input data to right justify it. Prior to the justification process, this value is always the same as that in 672 ($2A0).

continued next issue

MAPPING THE ATARI
$16.95, COMPUTE! Books, P.O. Box 5406, Greensboro, North Carolina 27403, (919) 275-9809.

Ian Chadwick is a Toronto-based freelance writer.



Kate Murphy

Take advantage of your XL/XE's upgraded memory with SmartRAM II. This BASIC super RAMdisk works on Atari XL and XE computers with a minimum 128K memory and requires DOS 2.5.

The various XL/XE memory upgrades have many differences, but they also have significant similarities. In this article I will discuss how these upgrades are alike, and even teach you how to talk to your extra memory so you can experiment with your own software.

SmartRAM 2.5 is a powerful RAMdisk that can take charge of your extra memory, no matter what upgrade you have installed. You'll find that SmartRAM 2.5 is more convenient and versatile than Atari's official RAMDISK.COM file.

For a good general description of the various Atari RAM upgrades you may wish to review *Dr. Brilliant's Incredible Atari Brain Transplants*, which appeared in the November 1988 issue of Antic. However, SmartRAM 2.5 does not support the Atari 800 upgrades.

All of the XL/XE upgrades are really very similar. It is not difficult to dis-

tinguish between them and it's a snap to talk to them. You can control any common XL or XE RAM upgrade with just a few bytes of code.

I will try to explain the function of SmartRAM 2.5 as clearly as possible, but it is complex, requiring some understanding of binary numbers and 6502 assembly language. However, you don't *need* to understand SmartRAM 2.5 in order to use it effectively.

TYPING IT IN

SmartRAM 2.5 requires Atari DOS 2.5. Boot with a copy of DOS 2.5 and type in Listing 1, RAMDISK.BAS, check it with TYPO II and SAVE a copy to disk before you RUN it. This listing is the BASIC translation of an assembly language program. The assembler source code is also on this month's Antic Disk so that experienced programmers can adapt it if they wish.

Make sure to RUN SmartRAM 2.5 in drive 1 on a disk which includes a copy of the genuine DOS 2.5. The program will check its own data and write out a RAMDISK.COM file to D1:. Your new RAMdisk is now ready to use. So reboot by pressing [RESET] and check it out.

The extra features don't cost more memory.

By the way, for all you 256K 800XL/1200XL users and 320K XE users: I have not tested this with BASIC-XE from OSS/ICD, but it should allow you to use the EXTEND mode with a "1050" RAMdisk! SmartRAM also works with the XE-GM1 and XE-GM2 RAM upgrades for the XEGS from Innovative Concepts.

SWITCHABLE BANKS

Located in the Atari's 6502 microprocessor, the program counter tells the computer where to go in memory for instructions or data. This counter is 16 bits wide. With 16 bits we can have 65,536 different addresses, or 64K of addressable memory.

While you can install the larger 256K RAM chips, the 6502 cannot "see" any more than 64K. It's like having a 256 story building with no elevators or stairs above the 64th floor. When extra memory is installed in a 64K computer, it must be done in a way that allows small pieces of it, called "banks", to temporarily replace a similar segment of the main memory. This "bank-switching" is what al-

continued on page 18

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lows us to have a 130XE with 128K, or an 800XL with 256K.

The Atari 130XE set the standard for bank-switching on all XL/XE computers. In the 130XE there is an extra 64K, which is accessed in four 16K banks. All of the currently available XL/XE upgrades utilize this method, which is the most striking similarity among them.

MEMORY CONTROL

You control this extra memory by setting or clearing bits at address 54017 decimal ($D301 hex), the PORTB register in the PIA chip. The eight bits of PORTB are assigned as

these XL/XE memory upgrades. However, since there is only one free bit at $D301 we do run into a "bit" of trouble, because not all upgrades select the same final control bit.

There are advantages and disadvantages to choosing that last bit. If we employ bit 7, the self-test is disabled. Choosing bit 1 will effectively eliminate access to built-in BASIC. This is of no consequence if you use BASIC XL or some other language in preference to Atari BASIC. But the largest upgrades use both bits.

TESTING BANKS

To use the extra memory, you need

```
STX    PORTB   ENABLE TEST
               BANK
CMP    $4000   ANY MORE
               HERE?
BNE    FOUND   YES! BRANCH
STY    PORTB   JUST IN CASE
               DATA IS SAME
EOR    #$FF    INVERT BYTE
STA    $4000   WRITE IT
               BACK
STX    PORTB   AND TEST IT
               AGAIN
CMP    $4000   STILL SAME?
FOUND  . . ..  ZFLAG CLEAR
               = PASSED
```

Note that we didn't need to test for

6502 bit-shifting instructions to move them into position. This won't work for SmartRAM 2.5 because you need different instructions depending on which bits you are shifting, and where you are moving them.

My solution was to figure out which bit patterns were necessary for each of the combinations. Then I assembled them into a bank control table. This is a table of bytes, from which SmartRAM pulls the needed bit address.

Bank Control Table Master:

130XE	$E3,$E7,$EB,$EF
Bit 6	$A3,$A7,$AB,$AF
Bit 5	$C3,$C7,$CB,$CF
Newell	$83,$87,$8B,$8F
Bit 7	$63,$67,$6B,$6F ;BANKS 4-7
Bit 7Z	$23,$27,$2B,$2F ;BANKS 0-3
Bit 1	$E1,$E5,$E9,$ED
Bit 1Z	$A1,$A5,$A9,$AD

There are a total of 32 bytes in the master table, but only four are used for 128K, eight for 192K, 12 for 256K, and 16 for 320K. As the memory test passes each stage, the proper bytes are placed into the control table. When the test is finished, so is the table.

After this, SmartRAM only has to use simple division to determine which bank it will be accessing and pull that byte from the table. For example, there are 128 single density "sectors" in each bank. If SmartRAM needs sector 129, it wants the second bank, so it just grabs the second byte from the table and stuffs it into PORTB. Poof, Bank 2 is in the window.

1050 EMULATOR

Now let's take a look at the SmartRAM 2.5 new 1050 Emulator. This will work in the standard 130XE with 128K, as well as upgrades with 192K or 256K.

The emulator can handle bits 2, 3, 5, 6, and 7 (sorry, no bit 1). In a stock 128K 130XE it will give you the normal Atari 499-sector RAMdisk. In a 192K XE it will give you a "1050" density RAMdisk. And in a 256K XL (or 320K XE) it will give you the 1050 RAMdisk without using any of the 130XE banks! This allows you to use the 130XE banks for other things (like BASIC-XE).

One of the nicest features of SmartRAM 2.5 is that it will only enable the MEM.SAV file if BASIC (or a cartridge) is active. I'm sure you have all been annoyed by that "TYPE 'Y' IF OK TO USE PROGRAM AREA" message, when you are just using DOS. This is no problem now. If you are not using BASIC, no MEM.SAV prompt is given. You can still use DOS option N (create MEM.SAV) if you want to preserve lower memory.

Another nice feature is the ability to reboot without reformatting a valid RAMdisk. If you have data previously written to the RAMdisk, a *software* reboot at $E477 will not wipe it out. SmartRAM can be "reboot proof" using the RAMaid coldstart reset button from Innovative Concepts as well. SmartRAM 2.5 checks for valid data before formatting, thus preserving your important data.

NO MEMORY LOSS

All this doesn't cost you any memory. I managed to stuff SmartRAM 2.5 into the locations used by Atari's old handler. And it doesn't cost you any disk space. SmartRAM 2.5 is only eight sectors long, actually one sector *shorter* than Atari's RAMDISK.COM.

Are there any limitations? Of course. As with all RAMdisks, save what you need to a real disk before you turn off the computer. When the power goes off, any files on RAMdisk will disappear. Also, when designing this program I decided for the sake of compatibility to retain as much of Atari's original DOS 2.5 RAMdisk handler as possible.

This means the program should work with anything designed for the DOS 2.5 RAMdisk. But it will still be incompatible with software that has problems with the old handler (like DUP.SYS option J).

Note that there is a small bug in DOS 2.5 (not SmartRAM 2.5) which will occasionally give unusual results when reading the RAMdisk directory. The size of the DUP.SYS file will be much larger than the normal 42 sectors. Sometimes a directory listing will report "999+ FREE SECTORS". This is also incorrect, but seems to cause no problems. Although annoying, this bug is apparently harmless, usually occuring after you run a binary file and return to DUP. The problem seems to be caused by the MEM.SAV routines. It usually doesn't happen if MEM.SAV is enabled.

When SmartRAM 2.5 loads into a machine with more than 128K, it patches DOS 2.5 to access the extra memory. While this patched DOS is completely functional and can be written out to a disk, it will no longer be compatible with the standard RAMDISK.COM file and a 128K Atari 130XE. So it is best to reboot without SmartRAM 2.5 before writing DOS. The DUP menu is modified to remind you that DOS has been modified.

Notice that the SmartRAM boot message is printed on the bottom of the screen, so as not to interfere with AUTORUN files that print a RUN "D1:FILENAME" type of message. The boot message will say D8:DISK EMULATOR for the 128K Atari 130XE, and D8:1050 EMULATOR for expanded memory systems. A message on the DUP menu will indicate 192K or 256K, as required. There is no special message for the standard 128K system configuration. ▲

Tim Patrick, 30, lives in Kaiua, on Hawaii's Oahu island. He enjoys assembly language programming and has written numerous utilities which can be found on bulletin boards as far away as Germany. This is his first **Antic** *appearance.*

Listing on page 38

Check your joystick accuracy and speed.

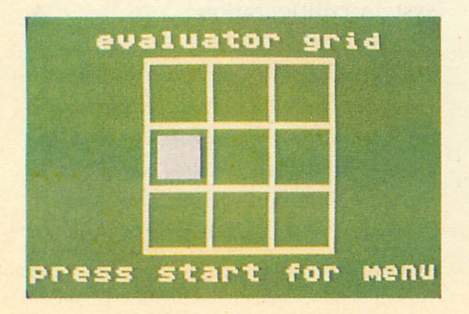
joystick

Ever wonder if that old gamer's alibi, "It's the joystick" might really be true? Check out the accuracy of your joysticks and the speed of your reflexes with this handy BASIC utility. Joystick Test Laboratory works on 8-bit Atari computers with at least 48K memory and disk drive.

By Kevin Gevatosky

Have you ever wondered just which joystick is right for you, or which stick will give the best performance in those fast-paced arcade games? Do you wish there was some way to test and rate a stick so you would know for sure which one to use? Well, if so, your wish has come true—Joystick Test Laboratory is here!

This simple BASIC program is designed to test you and your joystick for overall accuracy, horizontal & vertical positioning, diagonal positioning, and response time. The results are displayed so you can see for yourself just how well you performed with the joystick.



Not only will Joystick Test Laboratory help select the joystick that's right for you, but it can also be used to keep a record of your performance so you will know if your joystick abilities are improving or not and which areas might need work.

In addition to giving performance ratings, Joystick Test Laboratory also has the capability to test joysticks and paddles to make sure they are functioning properly. Of course, you could test them using BASIC's STICK and PADDLE functions (printing the values to the screen), but why keep driving a VW when you have a Porsche?

GETTING STARTED

Type in Listing 1, JOYTEST.BAS, check it with TYPO II, and SAVE a copy to disk. Then, RUN the program and a menu will appear with three options—Joystick Tester, Paddle Tester, and Evaluator. To select an option, just press the highlighted letter. But, before you do, be sure that a joystick or pair of paddles is plugged into joystick port 1.

When you select the first option, Joystick Tester, a 3×3 grid will appear on the screen. The squares of the grid represent the nine possible joystick positions.

With the joystick in the neutral position you should see a red colored in-

laboratory

dicator in the center of the grid. Move the joystick around and the indicator will also move to show the joystick's current position. Press the joystick button and the indicator will flash a brighter red. If you cannot get the indicator to move to all the positions of the grid or make it flash, then the joystick is not working properly.

When you have finished testing your joystick, press [START] and the program will return to the options menu.

PADDLE TESTER

The second option, Paddle Tester, will test a pair of paddles plugged into joystick port 1. Paddle 0 is represented by a yellow indicator and paddle 1 by a blue indicator. Turn the paddle knob clockwise and your indicator should move horizontally, left to right, across the screen. Press the paddle button and the entire background will flash yellow or green, depending on which paddle is being tested.

A numerical display shows the exact paddle value over the possible range of 0 to 225. A paddle that is functioning normally will be able to span the whole range of values and will not vary by more than 2 or 3 units when fixed at any particular position. As with the joystick test, press [START] to return to the options menu.

EVALUATOR

When the last option, Evaluator, is selected, you will be asked to enter the number of response cycles—from 10 to 100. The more cycles, the more representative the evaluation will be. But it will also take longer. If this is the first time you are using this option, try 10 cycles, just to get a feel for the process.

Next, you will be prompted to press the joystick button to start the evaluation. As soon as you press the trigger, the familiar 3×3 grid will be displayed and the red indicator will appear in one of the squares. As quickly as you can, move your joystick to the position indicated. A short beep tells you to act swiftly, because the timer is ticking away to measure your response time.

If the stick is moved to the correct position you will hear a high-pitched tone. If you make a mistake and move the stick in the wrong direction you will hear a low-pitched buzz. This completes one response cycle. To start the next cycle, just return the stick to the neutral position. The red indicator will appear somewhere else in the grid and the timer will start a countdown again.

Once you complete the specified number of cycles, the evaluation will end. If you don't want to finish the remaining cycles, you can abort the routine by pressing the [START] key.

INTERPRETING RESULTS

At the end of the evaluation the results will be displayed and are interpreted as follows:

Overall accuracy—This is the percentage of correct responses made.

Total error—This is the total number of incorrect responses, reported as a percentage.

Horizontal & vertical error—This is the percentage of the total error due to incorrect responses when prompted to move the stick in a horizontal or vertical direction.

Diagonal error—This is the percentage of the total error due to incorrect responses when prompted to move the stick in a diagonal direction.

Average response time—This is the average amount of time (total time/cycles), in seconds, that it took you to respond. This value is significant to a hundredth of a second.

After viewing these results, press the joystick trigger and the recorded values for the individual response cycles will be displayed. The "grid" and "response" categories show, respectively, values for both the indicator position on the grid and the actual position to which the joystick was moved. These values correspond to those given for BASIC's STICK(X) function.

Kevin Gevatosky of Eugene, Oregon is a full-time software engineer who enjoys writing programs for the 8-bit Atari. His most recent article, Butterfingers, *appeared in the May 1989 issue of **Antic**.*

Listing on page 36



XF35 Kit

Bob Woolley, originator of the XF35 Kit disk drive upgrade.

Vastly expanded disk capacity for your 8-bit.
Reviewed by Matthew Ratcliff

At one time Atari had intended to produce a 3.5-inch disk drive for their 8-bit computers to replace the aging 1050, a 5.25-inch model. After displaying the new drive at several computer shows, Atari changed its mind and instead produced the XF551, another 5.25-inch disk drive, capable of storing 360K of data per disk in double-sided, double-density format. If Atari had used a 3.5-inch drive, like those found in the Atari 1040ST, you could squeeze 720K of data onto a durable little disk that fits neatly in your shirt pocket.

Bob Woolley, a very active Atarian on CompuServe and hardware hacker extraordinaire, decided to see if it was possible to transplant a 720K, 3.5-inch floppy mechanism into an existing XF551 unit. Smart guy that he is, Bob found the task rather simple. All you had to do was remove the 5.25-inch mechanism, adapt a 3.5-inch drive to the case, plug in a new cable, and plunk a new EPROM chip into the controller board.

Many other CompuServe subscribers were quite interested in this project, and Mark Elliott of Innovative Concepts (I.C.) wisely made arrangements with Woolley to produce a kit and bring it to market.

The **XF35 Kit** comes with an upgrade EPROM, a 34-pin cable with connectors, a 4-pin power adapter cable, and a 34-pin male header. The actual drive mechanism is not provided, but can be obtained easily through IBM-PC mail order houses. Easy-to-follow instructions lead you through the 18 steps necessary for the replacement of the XF551 5.25-inch drive with a 3.5-inch unit.

TWIN DRIVE OPTION

Effectively, the 5.25-inch disk drive and controlling ROM are "discarded". An optional set of instructions, involving another 14 steps, shows you how to keep the 5.25-inch drive in place, and add on the 3.5-inch drive, making it possible to select one or the other using a toggle switch.

You will need to purchase the extra parts including an SPDT toggle switch, a DPDT toggle switch, a 5.25-inch disk drive power splitter, a 34-pin 5.25-inch drive connector, and a case for the 3.5-inch disk drive.

I performed the first installation just to verify that the upgrade would work properly. When I was satisfied that I could format, read, and write 3.5-inch disks to a full 720K with SpartaDOS or SpartaDOS X, and also with MYDOS 4.3b, I performed the dual drive upgrade.

A 3.5-inch disk drive can be ordered from just about any PC-compatible mail order outlet. But few of these come with cases. To minimize the "hacking" on a case, cabling and so forth, Bob Woolley recommends a Tandy 720K external disk drive, designed for use with Tandy's 1000 series PC-compatible computers and available at Tandy Computer and Radio Shack stores.

This Tandy drive comes mounted in a nice case that sits neatly on top of the XF551 unit. I found it on sale for $99 (catalog number 25-1061).

To modify the drive, you must first discard the Tandy disk drive interface cable, take apart the case and remove a small circuit board and cable. There

will then be a sufficient opening in the back for your drive interface and power cables to come out to the XF551.

An extra connector will have to be added to the flat ribbon cable that comes with the project, to allow the XF551 and Tandy (or similar 3.5-inch drive) to be connected "in parallel." The cable was just long enough to get the job done. The connector required for this task was called a "34-Position Card Edge Connector, Insulation Displacement Type." The cost was $3.95 (catalog number 276-1564A) at Radio Shack.

You will also need a "power splitter" to provide power to both the XF551 and the 3.5-inch units. I happened to have a spare from my last PC upgrade, but they are probably available from Radio Shack. This short cable plugs into the power connector inside the XF551, providing two connectors at the opposite end—one for the 5.25-inch drive and the other for the 3.5-inch.

The instructions specify SPDT and DPDT switches to toggle power (5 and 12 volts) and ROM selections between the two drives—which can only be used one at a time. However, since both switches must be flipped at the same time, a triple-pole, double-throw (TPDT) switch would be more appropriate, as the guide suggests.

DESOLDERING

The most difficult step in the upgrade is desoldering the circuit board end of the original XF551 disk drive ribbon connector—34 pins. I get the best results with a good 30-watt pencil soldering iron and copper braid (also called "solder wick"). A connector is then soldered in its place, making installation and removal of the new interface cable a snap.

For the dual-drive upgrade, a second card edge connector had to be added. The sample drawing showed it in the center of the cable, but I found that it fit best closer to the XF551. The remainder of the cable for the 3.5-inch drive extended out the back of the XF551, up into the opening at the bottom rear of the 3.5-inch drive case, and up to the drive's circuit board. It was a snug fit with my Tandy drive.

The power connectors for each drive and ROM selects have to be wired into opposite sides of the toggle switch(es). Care must be taken to get the power and ROM select for the proper drive both on one side of the switch. The switch should only be changed while the main drive power switch is off. With the TPDT switch there is no way to accidentally run a drive with the wrong ROM.

You can get I.C.'s upgraded XF35 Kit including all extra switches.

This upgrade went smoothly. Mark Elliot's instructions are completely detailed, and I seldom needed to refer to his schematics. Remember, though, that the upgrade will most certainly void any warranty remaining on your XF551. If you purchase a new Tandy 3.5-inch drive, its warranty is not likely to be valid after cracking its case, either.

If you are a veteran hardware hacker and have a steady hand you have little to worry about. The upgrade is easily reversed. If you have problems with the 3.5-inch unit, simply replace the 5.25-inch drive. Once you piggyback the ROMs and add the switch, however, the upgrade is basically permanent.

SUPER FLOPPIES

Now, with SpartaDOS 3.2d, SpartaDOS X, or MYDOS 4.3b (and possibly earlier versions of MYDOS), I can create HUGE 720K disks on my 8-bit. The Tandy drive certainly made short work, on a very few disks, of backing up my 20 megabyte FA-ST hard drive. If you don't have a hard drive, these 720K disks may seem like "little hard drives." However, to get the full potential from your new drive, it's a good idea to use SpartaDOS,or some other DOS which allows more than 64 files per disk.

With the dual upgrade, it's easy to toggle back to full 5.25-inch disk compatibility. It's best to have yet another drive in your system, to make transfer between 5.25-inch disks and 3.5-inch disks a bit simpler. A large RAMdisk could also fill the bill.

Bob Woolley has created a patch utility program that will modify SpartaDOS 3.2d to support the XF551's high speed I/O (nearly tripling the data transfer rate between the drive and computer). Transfer rates are greatly increased with the XF35 drive as well. The latest incarnation of SpartaDOS X cartridge, 4.20, also supports high speed I/O on the XF35 upgraded drive.

Don't expect this upgrade to enable you to read and write Atari ST diskettes. The disks may be the same size, but the formats used are different. It may be possible to come up with a program that will write in ST format, but no one has yet tackled the job of writing the complicated software needed.

So you can't afford a hard drive, but want a *lot* of storage? If you aren't afraid of a little hardware hacking, then the XF35 Kit may be the perfect solution to your archive needs. You can copy *eight* single sided, single density Atari DOS 2.0 disks to one 720K 3.5-inch disk—a great way to clean up your old disks and recycle a lot of old 5.25-inch disks. ▲

XF35 Kit. $37.95 (incl. $3 s&h). Innovative Concepts, 31172 Shawn Drive, Warren, MI 48093. (313) 293-0730.

Op Amp CAD

Super Disk Bonus designs circuits

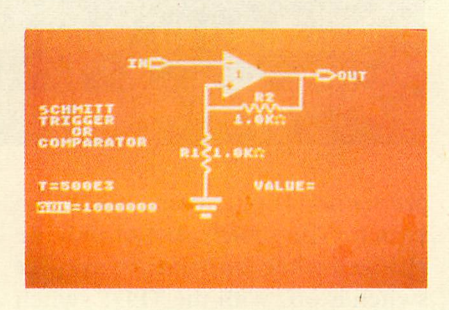
By David Hayes

This month's Super Disk Bonus is Op Amp CAD, a tool for designing operational amplifier circuits. The integrated circuit Op Amp is the workhorse of linear amplifiers used in most audio equipment. Its low cost and high performance has made it the amplifier of choice among professionals, students, and hobbyists alike.

To use Op Amp CAD properly you need to have some familiarity with operational amplifier circuit design. This lengthy, but useful, BASIC program makes it easy for you to experiment with different component values onscreen, because your Atari works out all the mathematical computations. Each time you enter a new value, the program works out new values for all the affected circuit elements. You'll see the results of each change immediately, and you can print out the values for reference.

This program was written by David Hayes of Huntsville, Alabama. Op Amp CAD requires an 8-bit Atari with at least 48K memory and disk. Op Amp CAD supports these basic circuit configurations—inverting, non-inverting, Schmitt trigger, integrator, differentiator, and adder circuits.

Choose a configuration from the main menu and the program displays a complete schematic of the op amp circuit. Op Amp CAD then allows you to [SELECT] the design components, input new values, and instantly see the results. Some circuit configurations can be changed by pressing [OPTION]. To return to the main menu, press [RESET].



If your printer is on, the name of the circuit and the various component values will automatically be printed, as well as displayed onscreen. Turn off the printer if you don't want the values printed. This program should work correctly with just about any 80-column printer.

Help files are built into the program and can be accessed by typing [H]. Highly informative error messages also provide help. For example, enter too low a resistor value and the program will warn you that you are risking a short circuit.

An extensive manual for Op Amp CAD is also on this month's Antic Disk. This manual provides detailed information on using the program and lists references for additional information on op amp design. If you are familiar with op amp basics, the program is so user-friendly it hardly needs documentation.

GETTING STARTED

Op Amp CAD should be run from drive 1, on its own disk. To create an Op Amp CAD disk, first format a blank disk (Atari DOS command [I]) then write DOS files to disk (Atari DOS command [H]). Then use Atari DOS command [C] to copy all the files with one-letter and two-letter filenames from this month's Antic disk.

Files L, T, R, P, C, and W are Atari BASIC programs for Op Amp CAD. The rest are HELP files. Copy AUTORUN.CAD to your disk and rename it AUTORUN.SYS. Turn the computer off, put your Op Amp CAD disk in Drive 1, and turn the computer on—with BASIC. (XL/XE owners don't hold down [OPTION]). Op Amp CAD should load and RUN automatically.

Your September 1989 Antic Disk—featuring Op Amp CAD plus a second Super Disk Bonus as well as every type-in program from this issue—will be shipped to you within 24 hours after receiving your order. Just phone Toll-Free to the Antic Disk Desk at **(800) 234-7001**. The monthly disk is only $5.95 (plus $2 for shipping and handling) on your Visa or MasterCard. Or mail a $5.95 check (plus $2 shipping and handling) to Antic Disk Desk, 544 Second Street, San Francisco, CA 94107.

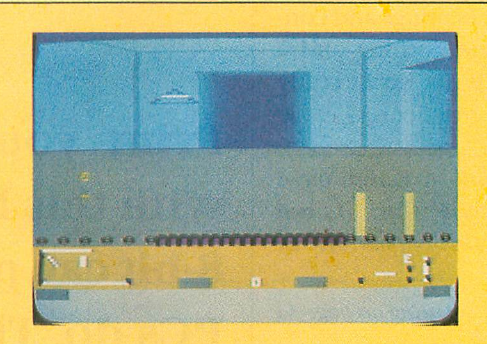
Salvage 2001

The alien spacecraft is all yours—
if you can stay alive long enough to salvage it.

By Jim Tesch

It's the 21st century, a great time for junk. What other century would let you own a surplus shuttle rocket and spacesuit? What other era would send you out for a test flight just when a huge alien starship—apparently abandoned—drifts into the solar system?

Pushing your spacecraft past the point of no return, you match orbits with the silent hulk. An initial scan shows the ship to be totally deserted but still functional. So, with your breathing echoing within your helmet you cross that last void between you and your dreams.



You're marooned in a mysterious alien spaceship and time is running out. Your only hope is to re-start this vessel and fly it home. This BASIC program works on 8-bit Atari computers with minimum 48K memory and disk drive.

GETTING STARTED

Type in Listing 1, SALVAGE.BAS, check it with TYPO II and be sure to SAVE a copy before you RUN it. If you have trouble typing the special characters in lines 1080-1100, don't type these lines. Instead, type in Listing 2. When you RUN Listing 2, it creates a file called LINES.LST. Merge this file with Listing 1 by typing LOAD "D:SALVAGE.BAS" and then ENTER "D:LINES.LST".

When you RUN the program the title screen will appear, showing the strange ship. Press [START] to board and begin exploring.

PLAYING THE GAME

To start the alien vessel, you must find the engineering sections on five of the ship's decks. Each deck has 30 rooms and the layout is always slightly different. Some of the ship's corridors are one way only and will close behind you as you pass.

You have a three dimensional (Graphics 9) view of the deck from your helmet. The lower part of your screen consists of a compass that indicates the direction you're facing (Port, Starboard, Aft or Bow) and points towards the bow of the ship. Indicator bars show your current oxygen and energy levels.

To move, just push your joystick in the direction you want to go. (Pull back on the joystick to turn around and go back to the room behind you.) You'll find oxygen and battery recharger stations on every deck. The oxygen is in large tanks. Recharger stations are indicated by a triangle. Just press the joystick button to replenish

your own supplies.

Because your suit is surplus, the longer you wear it the more likely that you'll get a blowout when you take on more oxygen or recharge your battery. You must move as quickly as you can to make it through the ship without a fatal accident.

The [OPTION] key will display your current room number at the cost of one turn of energy. After each level's engineering station has been activated by your presence, find the trans-shaft (shown by a bar on the wall) and you'll be beamed to the next level.

If you keep your bearings and continue moving, fame, fortune and a starship are yours. If not, space really will be your final frontier.

Jim Tesch of Fort Smith, Arkansas owns an ancient and wise Atari named "Gypsy." This is his first appearance in ANTIC.

Listing on page 34

Atari Print Screen

Automatic text screen dumps—just like a PC.

By Steve Derderian

Print your text screen automatically with this handy utility. Now your Atari 8-bit can print text screens the way IBM PCs do. This BASIC program works on all 8-bit Atari computers of any mem-

If you ever used an IBM Personal Computer or compatible, you probably learned about the useful Print Screen button on the keyboard. When pressed, the print screen button copies the text from the screen to the printer. Your Atari computer does not have a print screen button, but, with the aid of a short program, Print Screen, we can emulate the PC print screen button.

Print Screen was written in MAC/65 assembly language. But you don't need to own the MAC/65 cartridge in order to use Print Screen.

GETTING STARTED

Type in Listing 1, PRTSCRN.BAS, check it with TYPO II, and SAVE a copy before you RUN it. When RUN, PRTSCRN.BAS creates a stand-alone machine language program called PRTSCRN.EXE. Antic Disk owners will find PRTSCRN.EXE on the monthly disk.

Don't try to run Print Screen from the Antic Monthly Disk. Copy PRTSCRN.EXE to another disk that has the DOS.SYS file on it. Then use DOS to rename PRTSCRN.EXE to AUTORUN.SYS so that it will run automatically when you insert the disk.

Print Screen's MAC/65 assembler source code is in Listing 2, which is provided for MAC/65 programmers. You don't need Listing 2 to use Print Screen.

PRINT YOUR SCREEN

Simply press [SHIFT][CONTROL][P] whenever you want a printed copy of the text screen. (Of course, make sure that your printer is turned on first.)

To test Print Screen, try going to DOS. (Make sure your disk has both DOS.SYS and DUP.SYS on it). Display a directory of your disk and then print it by pressing the [SHIFT][CONTROL][P] combination. Print Screen will also work on BASIC programs LISTed onscreen—except for the special characters, which most printers cannot handle.

When you press [SHIFT][CONTROL][P] the program that is running is interrupted and Print Screen takes over. It will copy all twenty-four screen lines to the printer and then allow the host program to continue. NOTE: Trying to print screens in Graphics and Text Modes with less than twenty-four lines may cause problems.

Print text screens with a simple key combination.

Pressing the [RESET] button will not remove Print Screen from your computer's memory. The only way to get rid of it is to turn off your computer and then boot with a different disk.

Unfortunately, Print Screen will not work with any program that controls the keyboard interrupt vector such as AtariWriter, ACTION! and most games. It will work fine with any program that inputs and outputs through the standard E: screen editor. Luckily, this includes your BASIC and assembler languages as well as most application programs.

(DOS 2.5 directories print just fine, but not DOS 2.0 directories. At this writing, we don't know why.—ANTIC ED)

Like the PC button, Print Screen *isn't* a graphics dump. Any graphics you try to print will generally come out as garbage. Still, you might try printing scoring screens from BASIC games, for example. Just enough may be readable to be useful, or to prove you really *did* get that high score.

Steve Derderian is an application engineer for Comerica Bank in Detroit, Michigan.

Listing on page 39

Two-Game Disks From Mastertronics

L.A. SWAT and Panther, Las Vegas Video Poker and Vegas Jackpot

Reviewed by David Plotkin

L.A. SWAT, PANTHER

The first disk includes two arcade games that feature decent graphics and are difficult to master. In **L.A. SWAT**—the better game from a standpoint of overall playability—you are in command of a patrol penetrating gang territory. There are initially three patrol members, but you control only the squad leader and he is the only one vulnerable.

The idea is to move up a street filled with obstacles. There are buildings on both sides and the streets are filled with hostile (are there any other kind?) gang members. These will attack your squad leader with clubs if they get too close, so you must shoot them to prevent it. They also toss grenades, and you must try to anticipate where the grenade will land and move out of the way.

You control the squad leader with your joystick, and he shoots only in the direction he is traveling. His machine gun has a moderate range and it isn't too difficult to take out the gang members in the early levels.

You can use obstacles for shelter. Gang members seem to be able to climb over most obstacles while your way is effectively blocked by the barriers. Snipers on the rooftops fire at you, and there doesn't seem to be a way to bring them down. All you can do is avoid their bullets. Complicating matters further is the presence of innocent bystanders, who will cost you a hefty 1,000-point penalty if you blast them.

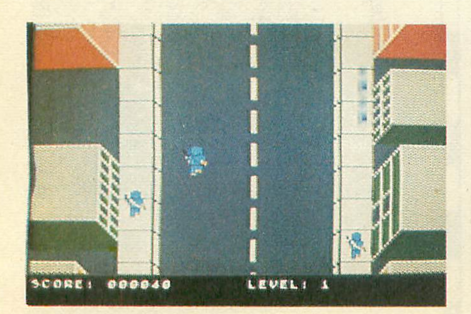
At the end of each level there is an intersection swarming with gang members, who come at you from all directions. If you manage to survive the intersection, then you move on to the next level, where the gang members become more aggressive—there are more of them and some shoot back. When the squad leader is taken out, one of the remaining patrolmen takes his place, until they are all gone.

L.A. SWAT is quite playable and convincingly animated, although very violent. Somehow, I don't think the Los Angeles Police Department would be amused by this game!

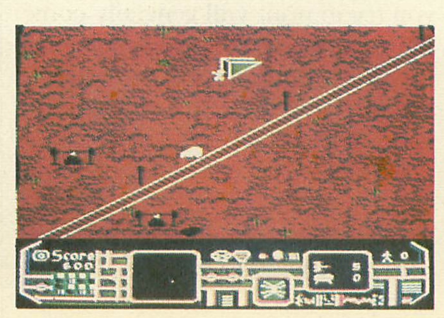
Panther is a science fiction game, somewhat reminiscent of Blue Max and Choplifter. You pilot your saucer across the scrolling landscape, landing periodically to take aboard survivors (hidden in bunkers) of an alien attack. The view is three-quarter perspective, so that the landscape scrolls from the upper right to the lower left corner of the screen.

To control your saucer, you must use the joystick. Mostly, you control the altitude—if you fly too low, you can pile into one of the features which dot the landscape: telephone poles, buildings, bunkers, etc. You can't control the speed. Instead, the saucer travels faster as you move higher.

You can land by pressing the joystick all the way forward. If you do so by a bunker, small figures will climb aboard your craft. You can also fly left and right across the screen, and fire your missiles by pressing the joystick button.



L.A. Swat



Panther



Las Vegas Video Poker

Mastertronic recently released a pair of double-game packages as "flippy" disks with Atari versions on one side and Commodore 64 versions on the reverse. At only $9.99 apiece, these disks are good entertainment values despite some shortcomings.

Of course, the aforementioned aliens are not standing idly by while you are doing all this. They launch attack waves at you, and you must depend on skill (and luck) to avoid them. The aliens swarm about you, trying not only to shoot you down with their missiles, but also to ram you! And they always seem to show up when you have landed to pick up survivors.

The aliens are very difficult to avoid because it's hard to tell how high you are. There is no real measure of altitude, although after a while you learn to judge when you are at the same altitude as an alien, so you can shoot it down.

The graphics of Panther are a mixed bag. The landscape is highly detailed, but the spacecraft resemble nothing so much as blobs. The landscape changes as the game progresses, with desert, city and ocean scenes among the variations.

This is a tough game, and most of your early games will be very short as the alien attack waves mow you down. One good feature is that you don't lose your survivors when your craft is shot down. L.A. SWAT and Panther in combination make a good gaming value.



Vegas Jackpot

LAS VEGAS VIDEO POKER, VIDEO JACKPOT

The second flippy consists of two gambling games with good graphics. But one game is not a very faithful simulation, and both are marred by the fact that only instructions for the Commodore version are included in package. It takes some significant trial and error to figure out how they work on the Atari.

Las Vegas Video Poker is a simulation of Jackpot Poker. You can choose to play with nickles, quarters or dollars, but since it isn't real money, just take your pick.

Place as many as five coins in the slot by pressing the [RETURN] key, then press the [SPACEBAR] to draw a five-card poker hand. The cards are displayed across the top of a simulated slot machine.

Once the cards are displayed, press the number keys at the top of the keyboard to designate which cards you want to hold. Then press the [SPACEBAR] again to draw replacement cards. The machine pays off according to how good a poker hand you have. Minimum payment (return of your bet) requires a pair of jacks. The maximum payment (250 coins) comes for a royal flush, a hand that I never saw in all the time I've played Video Poker.

The graphics for Video Poker are good, as are the sound effects. Unfortunately, the interface is clumsy and uses widely separated keys. The joystick would have made a superior control mechanism, even simulating the pulling action of a real slot machine.

The other game in this package is **Vegas Jackpot**, a slot machine simulation that's unlike any slot machine I've ever seen.

First of all, you can only bet one coin and there's only a single pay line. Real slot machines give you more chances to win with multiple pay lines as the stakes go up. There are also some lights across the top of the machine. After each spin some of the lights light up. Occasionally, you get a chance to "hold" your choice of the four reels, so that on the next spin, the selected reels don't move. There is also something called a "nudge," which automatically moves the reels to a winning position and awards a random jackpot.

There are a few significant problems with Video Vegas. Again, the clumsy interface doesn't use the joystick. More seriously, however, the instructions are only for the C64 version. There are no instructions on how to use the hold or nudge features on the Atari! The instructions for the C64 even state that you can save your nudges and gamble them, but I was never able to figure out how to accomplish this.

Overall, the Video Poker game is good enough to warrant purchasing this package, and Vegas Jackpot is a nice bonus.

$9.99 each. Mastertronic, 711 West 17th Street, Suite G9, Costa Mesa, CA 92627. (714) 631-1001.

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Biker Dave Atari

Double Disk Bonus Game.

By Erik Lowell

Be a daring stunt-devil in this month's *Second* Super Disk Bonus, Biker Dave Atari. This thrilling, high-tech motorcycle game has you riding your bike through hoops and over cars.

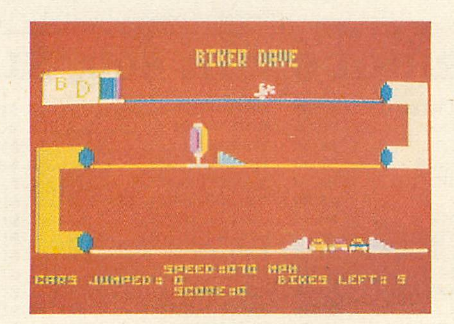
A lengthy BASIC program, Biker Dave Atari can be RUN directly from your Antic Monthly Disk. From the main menu, simply choose BIKER.BAS and you'll be off and riding.

Use your joystick to choose your skill level, Rookie! or Pro! Beginners are advised to start out at Rookie!

REVVING UP

A flashing message tells you to get ready, and then the engine starts. Your special stunt bike starts out of its customized garage at a roaring 5 miles per hour. But with every press of the joystick button your speed goes up in 5 mph increments. Keep an eye on the speed indicator at the bottom of the screen—go over 110 mph on the first stretch and you won't even make it through the first turn in the giant pipe.

Making your ride even more difficult—there's no way to slow down this specialized speed demon.



There's no way to slow this speed demon.

The object is to find a speed that will get you across the ramp jump, without overshooting the ramp on the other side. If you make it over you get extra points, the ramps move back, and you get an extra car to jump. With each additional car, the speed you need to get over increases—but there's no specific speed increment between jumping three, four, five, six or seven cars.

One mistake, and you'll land with a resounding crash, wiping out your bike. Don't despair—you get five bikes, and you'll need them all, as you try to jump over the ever-increasing lines of cars.

Biker Dave was programmed by Erik Lowell of Gilbertville, Massachusetts. He's a 14-year-old programmer who is very interested in becoming a professional software developer.

Your September 1989 Antic Disk—featuring two Super Disk Bonuses as well as every type-in program from this issue—will be shipped to you within 24 hours after receiving your order. Just phone Toll-Free to the Antic Disk Desk at **(800) 234-7001**. The monthly disk is only $5.95 (plus $2 for shipping and handling) on your Visa or MasterCard. Or mail a $5.95 check (plus $2 shipping and handling) to Antic Disk Desk, 544 Second Street, San Francisco, CA 94107.

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SOFTWARE LIBRARY

TYPING SPECIAL ATARI CHARACTERS

The Atari Special Characters and the keys you must type in order to get them are shown below:

For [CONTROL] key combination, *hold down* [CONTROL] while pressing the next key. For inverse [CONTROL] [A] through [CONTROL] [Z], press the [◪] key—or [⅄] on the 400/800—then *release* it before pressing the next key. (Press [◪] or [⅄] again to turn off inverse.) For [ESC] key combinations, press [ESC] and then *release* it before pressing the next key.

Carefully study the chart above and pay close attention to differences between lookalike characters such as the slash key's [/] and the [CONTROL] [F] symbol [◪].

NORMAL VIDEO

FOR THIS	TYPE THIS
	CTRL ,
	CTRL A
	CTRL B
	CTRL C
	CTRL D
	CTRL E
	CTRL F
	CTRL G
	CTRL H
	CTRL I
	CTRL J
	CTRL K
	CTRL L
	CTRL M
	CTRL N
	CTRL O
	CTRL P
	CTRL Q
	CTRL R
	CTRL S
	CTRL T
	CTRL U
	CTRL V
	CTRL W
	CTRL X
	CTRL Y
	CTRL Z
	ESC ESC
	ESC CTRL −
	ESC CTRL =
	ESC CTRL +
	ESC CTRL *
	CTRL .
	CTRL ;
	SHIFT =
	ESC SHIFT CLEAR
	ESC DELETE
	ESC TAB

INVERSE VIDEO

FOR THIS	TYPE THIS
	ESC SHIFT DELETE
	ESC SHIFT INSERT
	ESC CTRL TAB
	ESC SHIFT TAB
	⅄ CTRL .
	⅄ CTRL ;
	⅄ SHIFT =
	ESC CTRL 2
	ESC CTRL DELETE
	ESC CTRL INSERT

TYPO II AUTOMATIC PROOFREADER

TYPO II automatically proofreads **Antic**'s type-in BASIC listings. Type in the listing below and SAVE a copy to disk or cassette. Now type GOTO 32000. At the prompt, type in a single program line **without the two-letter TYPO II code at the beginning**. Then press [RETURN].

Your line will reappear at the bottom of the screen. If the TYPO II code does not match the code in the magazine, then you've mistyped your line.

To call back a previously typed line, type [*], then the line number, then [RETURN]. When the completed line appears, press [RETURN] again. This is how TYPO II proofreads itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000. To remove TYPO II from your program, type LIST "D:FILENAME",0,31999, then [RETURN], then NEW, then ENTER "D:FILENAME", then [RETURN]. Now you can SAVE or LIST your program to disk or cassette.

Don't type the TYPO II Codes!

```
WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
         SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "↖":POSITION 11,1:? "TYPO II"
EM 32050 TRAP 32040:POSITION 2,3:? "Type
         in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
         $:IF LINE$="" THEN POSITION 2,4:LIST B
         :GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
         E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
         GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
ET 32120 ? "↖":POSITION 11,1:? "TYPO II
         ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
         LINE$="" THEN ? "LINE ";B;" DELETED":G
         OTO 32050
VU 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
         ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
         (LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
         t match press RETURN and edit line a
         bove.":GOTO 32050
```

ALIEN SPACECRAFT IS ALL YOURS—IF YOU CAN STAY ALIVE LONG ENOUGH

SALVAGE 2001

Article on page 25

LISTING 1

Don't type the TYPO II Codes!

```
RI 1 REM SALVAGE 2001 BY JIM TESCH
EI 2 REM (C) 1989 ANTIC PUBLISHING
XZ 10 GOSUB 1700:GOSUB 1490:GOSUB 1070:GO
   SUB 1140
SY 20 GOSUB 1360:POKE 559,46:GOSUB 1340:T
   XT$="SALVAGE 2001":Y=9:GOSUB 1320:TXT$
   ="BY JIM TESCH":Y=10:GOSUB 1320
IB 30 TXT$="PRESS START":Y=11:GOSUB 1320
JI 40 POKE 53277,2:T=0:LVL=1:O=21:E=21:OL
   OSS=0.4:ELOSS=0.3:SCORE=0:POKE 704,94:
   POKE 705,94
PE 50 IF PEEK(53279)=6 THEN GOSUB 370:GOS
   UB 420:I=2^2^2^2:GOSUB 310:GOTO 70
LK 60 C=15*(C<>15):COLOR C:PLOT 39,4:PLOT
    39,34:PLOT 68,28:FOR I=1 TO 200:NEXT
   I:GOTO 50
NB 70 IF LVL=6 THEN GOTO 340
PV 80 GOSUB 900:GOSUB 470:POKE 53279,8
SY 90 IF O<=0 OR E<=0 THEN GOTO 320
GW 100 IF  NOT R(ROOM) THEN 190
AR 110 IF R(ROOM)=1 AND STRIG(0)=0 THEN S
   OUND 0,25,8,6:O=21:GOSUB 370:SOUND 0,0
   ,0,0
DR 120 IF R(ROOM)=2 AND STRIG(0)=0 THEN S
   OUND 0,5,2,6:E=21:GOSUB 420:SOUND 0,0,
   0,0
GC 130 IF R(ROOM)<>3 OR (R(ROOM)=3 AND EN
   G=1) THEN 160
IE 140 ENG=1:Y=9:TXT$="ENGINEERING":GOSUB
    1320:I=2^2:SOUND 0,250,2,8:GOSUB 775
HL 150 SCORE=SCORE+2500:GOSUB 310:POKE 73
   4,32+(LVL*16):SOUND 0,0,0,0
MJ 160 IF R(ROOM)<>4 OR (R(ROOM)=4 AND EN
   G=0) THEN 190
UT 170 POKE 734,32:TXT$="TRANSHAFT ACTIVE
   ":Y=9:GOSUB 1320:LVL=LVL+1:GOSUB 785
VE 180 SCORE=SCORE+5000+1000*((T-LVL*240)
   <0):GOSUB 310:GOTO 70
JI 190 STK=STICK(0):T=T+1
WT 200 IF STK=6 OR STK=5 OR STK=9 OR STK=
   10 OR STK=15 THEN 260
ZH 210 IF STK=14 AND D(F(1)+F) THEN ROOM=
   ROOM+D(F(1)+F):NR=1
LR 220 IF STK=7 AND D(F(2)+F) THEN ROOM=R
   OOM+D(F(2)+F):F(1)=F(2):NR=1
EW 230 IF STK=13 AND D(F(3)+F) THEN ROOM=
   ROOM+D(F(3)+F):F(1)=F(3):NR=1
JA 240 IF STK=11 AND D(F(4)+F) THEN ROOM=
   ROOM+D(F(4)+F):F(1)=F(4):NR=1
FO 250 IF NR THEN NR=0:GOSUB 470
ZY 260 IF PEEK(53279)=6 THEN 20
BH 270 IF PEEK(764)=48 THEN 270
DM 280 IF PEEK(53279)=3 THEN TXT$="ROOM "
   :TXT$(6)=STR$(ROOM):Y=9:GOSUB 1320:GOS
   UB 420:GOSUB 420:POKE 53279,8
ZT 290 IF T/50=INT(T/50) THEN GOSUB 890
SG 300 GOTO 90
WA 310 TXT$="           ":Y=12:GOSUB 1320:TX
   T$=STR$(SCORE):GOSUB 1320:RETURN
UF 320 COLOR 0:FOR I=1 TO 6:X=RND(0)*79:Y
   =RND(0)*79:PLOT 39,39:DRAWTO X,Y:X2=X:
   Y2=Y:NEXT I
DV 330 TXT$="TERMINAL CONDITION":Y=9:GOSU
   B 1320:TXT$="ALL VITAL SIGNS CEASED":Y
   =10:GOSUB 1320:I=2^2^2^2:GOTO 20
IM 340 GOSUB 1340:GOSUB 1360:COLOR 15:PLO
   T 50,25:PLOT 52,25:PLOT 54,25
ZP 350 POKE 559,46:TXT$="SHIP ACTIVATED!"
   :Y=9:GOSUB 1320:TXT$="YOU ARE FAMOUS!"
   :Y=10:GOSUB 1320
MX 360 SCORE=SCORE*2:GOSUB 310:GOTO 40
TB 370 P=PM+512+89:POKE 53248,167:O=O-OLO
   SS:IF O>20 THEN O=20:GOTO 390:REM OXYG
   EN
ND 380 POKE P-O,0:POKE 704,50+166*(O>7)-(
   30*(O>14)):RETURN
MV 390 IF LVL=1 OR RND(0)*7500>T THEN GOT
   O 410
AI 400 C=PEEK(734):FOR I=14 TO 0 STEP -1:
   POKE 734,I:SOUND 0,250,0,I:O=O-RND(0)*
   O:NEXT I:POKE 734,C
FU 410 FOR I=1 TO 20:POKE P-I,0:NEXT I:FO
   R I=1 TO O:POKE P-I,120:NEXT I:POKE 70
   4,50+166*(O>7)-30*(O>14):RETURN
HT 420 POKE 53249,187:P=PM+640+89:E=E-ELO
   SS:IF E>20 THEN E=20:GOTO 440:REM ENER
   GY
FV 430 POKE P-E,0:POKE 705,50+166*(E>7)-(
   30*(E>14)):RETURN
UO 440 IF LVL=1 OR RND(0)*7500>T THEN GOT
   O 460
XO 450 C=PEEK(734):FOR I=14 TO 0 STEP -1:
   POKE 734,I:SOUND 0,250,0,I:E=E-RND(0)*
   E:NEXT I:POKE 734,C
YH 460 FOR I=1 TO 20:POKE P-I,0:NEXT I:FO
   R I=1 TO E:POKE P-I,120:NEXT I:POKE 70
   5,50+166*(E>7)-30*(E>14):RETURN
LH 470 POKE 559,0:POKE 87,9:POKE 77,0:GOS
   UB 1760:GOSUB 1340:REM ROOM DRAW
VF 480 IF F(1)=0 THEN F(2)=1:F(3)=2:F(4)=
   3
TM 490 IF F(1)=1 THEN F(2)=2:F(3)=3:F(4)=
   0
SC 500 IF F(1)=2 THEN F(2)=3:F(3)=0:F(4)=
   1
SN 510 IF F(1)=3 THEN F(2)=0:F(3)=1:F(4)=
   2
CR 520 COLOR 9:FOR I=0 TO 79:COLOR 9:PLOT
    0,I:DRAWTO 79,I:NEXT I:GOSUB 890
OG 530 COLOR 6:PLOT 18,10:DRAWTO 61,10:PL
   OT 18,10:DRAWTO 18,79:PLOT 61,10:DRAWT
   O 61,79
QF 540 FOR I=-1 TO 1:COLOR 7-I:PLOT 9-I,0
   :DRAWTO 17,9:PLOT 62,9:DRAWTO 70-I,0:N
   EXT I
MZ 550 F=(ROOM-1)*4:IF  NOT D(F(1)+F) THE
   N 580
BH 560 C=7:FOR I=10 TO 0 STEP -1:C=C-1*(C
   >0):COLOR C:REM C
QE 570 X=40-I:X2=40+I:Y=35-I:PLOT X,Y:DRA
   WTO X2,Y:PLOT X,Y:DRAWTO X,79:PLOT X2,
   Y:DRAWTO X2,79:NEXT I
BF 580 IF  NOT D(F(4)+F) THEN 620
PP 590 FOR I=-1 TO 1:COLOR 5-I:PLOT 0,12+
   I:DRAWTO 10,21:NEXT I:REM LEFT DOOR
OX 600 COLOR 4:FOR I=0 TO 10:PLOT 0,12+I:
   DRAWTO 10,22:NEXT I
OC 610 FOR I=0 TO 10:COLOR 10-I*0.5:PLOT
   10-I,23:DRAWTO 10-I,79:NEXT I
DY 620 IF  NOT D(F(2)+F) THEN 660
MT 630 FOR I=-1 TO 1:COLOR 5-I:PLOT 79,12
   :NEXT I:REM RIGHT DOOR
YY 640 COLOR 4:FOR I=0 TO 10:PLOT 79,12+I
   :DRAWTO 69,22:NEXT I
FS 650 FOR I=0 TO 10:COLOR 10-I*0.5:PLOT
   69+I,23:DRAWTO 69+I,79:NEXT I
OO 660 POSITION 4,4:POKE 87,0:GOSUB 1760:
   IF F(1)=0 THEN ? #6;"■":POSITION 4,2:?
    #6;"■"
GR 670 IF F(2)=0 THEN ? #6;"■":POSITION 4
   ,2:? #6;"■"
DL 680 IF F(3)=0 THEN ? #6;"■":POSITION 4
   ,2:? #6;"■"
MD 690 IF F(4)=0 THEN ? #6;"■":POSITION 4
   ,2:? #6;"■"
QC 700 POKE 87,9:GOSUB 1760:ON R(ROOM)>0
   GOSUB 700+20*(R(ROOM))
YV 710 POKE 559,46:RETURN
PI 720 REM OXYGEN DRAW
LM 725 COLOR 2:PLOT 55,37:DRAWTO 55,39:PL
   OT 54,38:DRAWTO 56,38:FOR I=-3 TO 3:CO
   LOR 11-I:PLOT 55,40:DRAWTO 55+I,45
```

```
ZS 730 NEXT I:X=52:FOR I=-3 TO 3:COLOR 12
   -I:PLOT X,45:DRAWTO X,79:X=X+1:NEXT I:
   RETURN
NV 740 COLOR 4:PLOT 25,37:DRAWTO 21,47:DR
   AWTO 29,47:DRAWTO 25,37:COLOR 15:PLOT
   23,42:DRAWTO 27,42
ZN 750 RETURN
TC 760 FOR I=1 TO 6:COLOR 3:PLOT 20+I,15:
   DRAWTO 20+I,37:PLOT 53+I,15:DRAWTO 53+
   I,37:NEXT I:IF ENG THEN 775
ZR 770 RETURN
FD 775 FOR I=1 TO 20:C=RND(0)*16:COLOR C:
   X=RND(0)*5+21:Y=RND(0)*21+15:PLOT X,Y:
   PLOT X+33,Y:NEXT I
YZ 776 COLOR 14:PLOT 26,15:DRAWTO 53,15:R
   ETURN
BT 780 COLOR 0:PLOT 20,14:DRAWTO 59,14:RE
   TURN
TP 785 COLOR 15:FOR I=0 TO 39:PLOT 20+I,1
   4:SOUND 0,39-I,12,8:NEXT I
IH 790 FOR I=200 TO 0 STEP -1:COLOR RND(0
   )*15:PLOT RND(0)*79,RND(0)*79:SOUND 0,
   I,12,8:NEXT I:SOUND 0,0,0,0:RETURN
TX 890 FOR I=-8 TO 8 STEP 0.15:SOUND 0,80
   ,8,ABS(I):NEXT I:SOUND 0,0,0,0:GOSUB 3
   70:GOSUB 420:RETURN
JB 900 POKE 559,0:POKE 734,112:ENG=0:FOR
   I=1 TO 30:R(I)=0:NEXT I:REM DECK
SL 910 FOR I=1 TO 30:R=(I-1)*4:D(R)=-5*(I
   >5):D(R+1)=1*(I/5<>INT(I/5)):D(R+2)=5*
   (I<26)
MN 920 D(R+3)=-1*((I+4)/5<>INT((I+4)/5)):
   NEXT I
SS 930 FOR I=0 TO 99 STEP 12:R=INT(RND(0)
   *20)+I:D(R)=0:NEXT I
BG 940 FOR I=1 TO 6-LVL:REM OXYGEN
GJ 950 R=INT(RND(0)*30)+1:R(R)=1:NEXT I
HS 960 FOR I=1 TO 6-LVL:REM PLACE POWER
ED 970 R=INT(RND(0)*30)+1:IF R(R)<>0 THEN
   970
LI 980 R(R)=2:NEXT I
BN 990 R=INT(RND(0)*30)+1:IF R(R)<>0 THEN
   990:REM PLACE ENGINEERING
IV 1000 R(R)=3
AN 1010 R=INT(RND(0)*30)+1:IF R(R)<>0 THE
   N 1010
QU 1020 R(R)=4:ROOM=INT(RND(0)*30)+1
FE 1030 ROOM=INT(RND(0)*30)+1:IF R(ROOM)<
   >0 THEN 1030
SD 1040 F=(ROOM-1)*4
JP 1050 IF  NOT D(F) THEN F=F+1:GOTO 1050
KE 1060 F(1)=INT(F/ROOM)-1:RETURN
ZH 1070 POKE 559,0:DIM DLI$(96):REM DLI R
   OUTINES
TG 1080 DLI$="H..."
GD 1090 DLI$(41)="..."
IO 1100 DLI$(81)="..."
CV 1110 POKE DL,240:POKE DL+84,143:POKE D
   L+93,132:POKE DL+97,132
JT 1120 B=INT(ADR(DLI$)/256):A=ADR(DLI$)-
   B*256:POKE 512,A:POKE 513,B
JJ 1130 POKE 54286,192:POKE 256,Z:POKE 55
   9,34:RETURN
KJ 1140 POKE 87,0:GOSUB 1760:POKE 82,0
BR 1150 POKE 559,0:POKE 752,1:REM LOWER S
   CREEN
HT 1160 ? #6;"c c c c c caaaaaaaaaaaaaaa
   aac c c c c c";
MD 1170 ? #6;"...f bbbbbbbbbbbbbbb
   bb    ";
AF 1180 ? #6;"...
   0    E ...";
QH 1190 ? #6;"...  ...e  ...ffffff...
   ' ... ' ...  ";
AG 1200 ? #6;"...
   ' ... c";
MU 1210 ? #6;"...  ...e  ...
   ' ... ' ...  ";
DU 1220 ? #6;"...
   ' ...  ";
RF 1230 ? #6;"...  dddddddddddd
   ' ... ' ...  ";
SK 1240 ? #6;"...  dddddddddddddd
   ' ...  ";
JV 1250 ? #6;"dddd
   dddd";
DA 1260 ? #6;"ddd
   ddd";
DD 1270 ? #6;"ddd
   ddd";
YA 1280 ? #6;"dddddd
   dddddd";
BA 1290 ? #6;"c  c  c  c  c  c  c  c  c
   c  c  c  c  c";
AF 1300 RETURN
NR 1310 REM TEXT PRINTER
WK 1320 G=PEEK(87):POKE 87,0:GOSUB 1760:X
   =20-LEN(TXT$)/2:X2=X:FOR I=1 TO LEN(TX
   T$):POSITION X,Y:? #6;TXT$(I,I)
LF 1330 SOUND 0,4,10,8:SOUND 0,0,0,0:X=X+
   1:NEXT I:POKE 87,G:GOSUB 1760:RETURN
KF 1340 G=PEEK(87):POKE 87,0:GOSUB 1760:F
   OR I=9 TO 11:POSITION 5,I
KM 1345 ? #6;"                            "
   :NEXT I:POKE 87,G
JZ 1350 GOSUB 1760:RETURN
QA 1360 POKE 87,9:POKE 734,0:POKE 559,0:G
   OSUB 1760:REM SETUP TITLE SCREEN
SS 1370 COLOR 0:FOR Y=0 TO 79:PLOT 0,Y:DR
   AWTO 79,Y:NEXT Y
JQ 1380 COLOR 12:FOR I=1 TO 25:X=RND(0)*7
   9:Y=RND(0)*79:PLOT X,Y:NEXT I
LS 1390 X=60:Y=10:FOR I=-2 TO 2:COLOR 8-A
   BS(I):PLOT X,Y:DRAWTO X+5,Y:Y=Y+1:X=X+
   I:NEXT I
DX 1400 X=25:Y=16:FOR I=-4 TO 4:COLOR 8-A
   BS(I):PLOT X,Y:DRAWTO X+14,Y:Y=Y+1:NEX
   T I:COLOR 15:PLOT 34,24:DRAWTO 36,24
QF 1410 X=31:Y=13:FOR I=-7 TO 7:COLOR 10-
   ABS(I):PLOT X,Y:DRAWTO X+5,Y:X=X+I:Y=Y
   +1:NEXT I
UP 1420 X=39:Y=12:FOR I=-8 TO 8:COLOR 11-
   ABS(I):PLOT X,Y:DRAWTO X+20,Y:Y=Y+1:NE
   XT I:REM BODY
QR 1430 X=33:Y=12:FOR I=-8 TO 8:COLOR 13-
   ABS(I):PLOT X,Y:DRAWTO X+5*(I<0),Y:X=X
   -1*(I<0):Y=Y+1:NEXT I
YM 1440 X=39:Y=5:FOR I=-14 TO 14:COLOR 15
   -ABS(I):PLOT X,Y:Y=Y+1:NEXT I:COLOR 5:
   PLOT 57,28:DRAWTO 67,28
BN 1450 X=72:Y=35:FOR I=0 TO 1:COLOR 10-I
   *4:PLOT X,Y:DRAWTO 74,Y:X=X-1:Y=Y+1:NE
   XT I
DZ 1460 X=50:COLOR 0:PLOT X,25:PLOT X+2,2
   5:PLOT X+4,25
BT 1470 X=72:Y=35:FOR I=0 TO 1:COLOR 10-I
   *4:PLOT X,Y:DRAWTO 74,Y:X=X-1:Y=Y+1:NE
   XT I
GO 1480 COLOR 12:PLOT 74,33:DRAWTO 74,34:
   RETURN
TZ 1490 POKE 559,0:CH=CHBAS*256:FOR I=0 T
   O 1023:POKE CH+I,PEEK(57344+I):NEXT I:
   RESTORE 1520:REM CHSET
AB 1500 READ A:IF A=-1 THEN POKE 559,34:P
   OKE 756,CHBAS:RETURN
ZU 1510 FOR I=0 TO 7:READ X:POKE CH+A*8+I
   ,X:NEXT I:GOTO 1500
NX 1520 DATA 1,0,60,60,60,60,0,60,0,16,0,
   252,204,204,204,204,252,0,17,0,240,48,
   48,48,48,48,0
AR 1530 DATA 18,0,252,12,12,252,192,252,0
   ,19,0,252,12,60,12,12,252,0,20,0,204,2
   04,204,252,12,12,0
UR 1540 DATA 21,0,252,192,192,252,12,252,
   0,22,0,252,192,252,204,204,252,0,23,0,
   252,12,12,60,48,48,0
LA 1550 DATA 24,0,252,204,204,252,204,252
   ,0,25,0,252,204,252,12,12,12,0,26,0,0,
   48,48,0,48,48,0
VN 1560 DATA 33,0,252,204,204,252,204,204
   ,0,34,0,252,204,240,204,204,252,0,35,0
   ,252,204,192,192,204,252,0
ZV 1570 DATA 36,0,240,204,204,204,204,240
   ,0,37,0,252,192,240,192,192,252,0,38,0
   ,252,192,240,192,192,192,0
NU 1580 DATA 39,0,252,192,192,204,204,252
   ,0,40,0,204,204,252,204,204,204,0,41,0
   ,252,48,48,48,48,252,0
EO 1590 DATA 42,0,12,12,12,204,204,252,0,
   43,0,204,204,240,240,204,204,0,44,0,19
   2,192,192,192,192,252,0
XD 1600 DATA 45,0,204,204,252,252,204,204
   ,0,46,0,252,204,204,204,204,204,0,47,0
   ,48,204,204,204,204,48,0
QA 1610 DATA 48,0,240,204,204,240,192,192
   ,0,49,0,48,204,204,204,204,60,15,50,0,
   252,204,204,240,204,204,0
SS 1620 DATA 51,0,252,192,252,12,12,252,0
```

continued on next page

```
   ,52,0,252,48,48,48,48,48,0,53,0,204,20
   4,204,204,204,252,0
IB 1630 DATA 54,0,204,204,204,204,252,46
   0,55,0,204,204,204,252,252,204,0,56,0
   204,204,48,48,204,204,0
PM 1640 DATA 57,0,204,204,48,48,48,48,0,5
   8,0,252,12,60,240,192,252,0,86,16,16,1
   6,16,16,16,16,16
DG 1650 DATA 92,0,48,252,204,48,48,48,0,9
   3,0,48,48,48,204,252,48,0,94,0,12,48,2
   55,48,12,0,0
GY 1660 DATA 95,0,48,12,255,12,48,0,0,97,
   20,85,105,105,105,105,105,105,98,105,1
   05,105,105,85,20,0,0
RG 1670 DATA 99,0,20,65,85,65,20,0,0,100,
   255,255,255,255,255,255,255,255,101,0,
   0,0,255,255,255,255,255
KX 1680 DATA 102,0,0,0,170,170,170,170,17
   0, 103,170,170,170,170,170,170,170,170
   ,124,192,192,192,192,192,192,192,192
FR 1690 DATA -1
UH 1700 A=PEEK(106):PMBAS=A-8:CHBAS=A-16:
   POKE 106,CHBAS:POKE 54279,PMBAS:DL=153
   6:REM DISPLAY LIST
LM 1710 DIM TXT$(30),R(30),D(119),F(4):PM
   =PMBAS*256:GRAPHICS 8:POKE 559,0
RT 1720 FOR I=0 TO 2:POKE DL+I,112:NEXT I
   :POKE DL+3,79:POKE DL+4,PEEK(88):POKE
   DL+5,PEEK(89)
AU 1730 FOR I=6 TO 84:POKE DL+I,15:NEXT I
   :FOR I=85 TO 98:POKE DL+I,4:NEXT I:POK
   E DL+99,65
TP 1740 S1=PEEK(88):S2=PEEK(89):S4=S1+S2*
   256+3200:S3=S4-256*INT(S4/256):S4=INT(
   S4/256)
RC 1750 POKE 560,0:POKE 561,DL/256:POKE 5
   59,34:RETURN
VO 1760 IF PEEK(87)=9 THEN POKE 88,S1:POK
   E 89,S2:RETURN :REM SCREEN MEMORY
LA 1770 POKE 88,S3:POKE 89,S4:RETURN
```

LISTING 2

```
HV 10 REM SALVAGE, LISTING 2
VY 20 REM BY JIM TESCH
GD 30 REM (c) 1985,1988 ANTIC PUBLISHING
EV 40 REM (LINES 10-250 MAY BE USED WITH
   OTHER BASIC LOADERS IN THIS ISSUE.
IJ 50 REM CHANGE LINE 70 AS NECESSARY.)
PR 60 DIM FN$(20),TEMP$(20),AR$(93):DPL=P
   EEK(10592):POKE 10592,255
WO 70 FN$="D:LINES.LST":REM THIS IS THE N
   AME OF THE DISK FILE TO BE CREATED
RD 80 ? "Disk or Cassette?";:POKE 764,25
   5
PY 90 IF  NOT (PEEK(764)=18 OR PEEK(764)=
   58) THEN 90
TH 100 IF PEEK(764)=18 THEN FN$="C:"
UB 110 POKE 764,255:GRAPHICS 0:? "      AN
   TIC'S GENERIC BASIC"
MY 120 ? ,"BY CHARLES JACKSON"
KB 130 POKE 10592,DPL:TRAP 200
PU 140 ? :? :? "Creating ";FN$:? "...plea
   se stand by."
LW 150 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BQ 160 AR$="":READ AR$
YC 170 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DM 180 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")      "
BK 190 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 160
MM 200 IF PEEK(195)=5 THEN ? :? :? "TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
CM 210 IF C<LN+1 THEN ? :? "TOO FEW DATA
    LINES!":? "CANNOT CREATE FILE!":END
UQ 220 IF FN$="C:" THEN ? :? " Prepare ca
   ssette, press [RETURN]"
AR 230 OPEN #1,8,0,FN$
PV 240 POKE 766,1:? #1;A$;:POKE 766,0
AL 250 CLOSE #1:GRAPHICS 0:? " COMPLETED 
   "
GT 1000 DATA 143
YA 1010 DATA 0490480560480320680760730360
   610340721730000012380000011410102122 01
   0002080131690641410272 08173
MV 1020 DATA 2220021410262081040642010012
   0803216900014102720816900014102203415 5
   049048057048032068076073036
YV 1030 DATA 0400520490410610342081690661
   4102320816921614102420816920014102520 8
   1690061410262081040642 01002
SJ 1040 DATA 2080171690141410242081690061
   4102520816920014103415504904904804803 2
   068076073036040056049041061
NM 1050 DATA 0340262081040641690001410000
   011690101410262081040640 34155
```

CHECK YOUR JOYSTICK ACCURACY AND SPEED

JOYSTICK LABORATORY

Article on page 20

LISTING 1

Don't type the TYPO II Codes!

```
QK 100 REM ***************************
VQ 110 REM *   THE JOYSTICK TESTER   *
KT 120 REM * BY KEVIN C. GEVATOSKY   *
WF 130 REM *     COPYRIGHT 1989      *
FL 140 REM *    ANTIC PUBLISHING     *
QU 150 REM ***************************
DU 160 POKE 106,PEEK(106)-2
PD 170 DIM GRID(101),RESPONSE(101),RTIME(
   101)
HR 180 DBTIME=10
JS 190 GRAPHICS 2+16:SETCOLOR 4,5,0
BN 200 ? #6;" *■*■*■*■*■*■*■*■*■*■*"
QG 210 ? #6;" ■JOySTIcK TEsTER■"
BR 220 ? #6;" *■*■*■*■*■*■*■*■*■*■*"
WM 230 ? #6:? #6;"  JOYSTICK TESTER"
KQ 240 ? #6:? #6;"  pADDLE TESTER"
PK 250 ? #6:? #6;"  eVALUATOR"
RV 260 IF INIT THEN 470
RB 270 REM
OJ 280 REM *** SETUP A RAM CHAR. SET ***
RF 290 REM
DU 300 INIT=1:POSITION 2,11:? #6;"initia
   lizing"
KY 310 RAMSET=PEEK(106)*256
ST 320 ROMSET=226*256
BZ 330 FOR Y=1 TO 64
TX 340 FOR X=0 TO 7
WY 350 CHAR=PEEK(ROMSET+X)
PC 360 POKE RAMSET+X,CHAR
MB 370 NEXT X
TV 380 ROMSET=ROMSET+8:RAMSET=RAMSET+8
MP 390 NEXT Y
KX 400 RAMSET=PEEK(106)*256
WQ 410 FOR X=0 TO 7:POKE RAMSET+X,0:NEXT
   X
RQ 420 FOR X=0 TO 7:POKE RAMSET+(16*8)+X,
   255:NEXT X
SA 430 POSITION 2,11:? #6;"
   "
QX 440 REM
```

```
MV 450 REM *** GET KEYBOARD RESPONSE ***
RB 460 REM
UQ 470 OPEN #1,4,0,"K:":GET #1,K:CLOSE #1
DC 480 IF K>96 THEN K=K-32
BN 490 IF K=ASC("J") THEN TEST=1:GOTO 590
JD 500 IF K<>ASC("E") THEN 570
XI 510 GRAPHICS 0:POKE 752,1:? :? :? "Ent
   er a number from 10 to 100 for the"
RT 520 ? "number of response cycles.":?
AX 530 TRAP 530:INPUT CYCLES:IF CYCLES<10
    OR CYCLES>100 THEN ? :? "A number fro
   m 10 to 100 please!":GOTO 530
JO 540 TRAP 32000
YT 550 ? :GOSUB 2550
FD 560 CNT=0:MISS=0:DMISS=0:TTIME=0:TEST=
   0:GOTO 590
TS 570 IF K=ASC("P") THEN GOTO 2160
QD 580 GOTO 470
FY 590 GRAPHICS 16+2
ZZ 600 POKE 756,PEEK(106)
PC 610 IF  NOT TEST THEN 650
XJ 620 SETCOLOR 4,7,4
SL 630 POSITION 1,0:? #6;"joystick test g
   rid"
QQ 640 GOTO 670
BN 650 SETCOLOR 4,10,2
KG 660 POSITION 3,0:? #6;"evaluator grid"
GQ 670 POSITION 5,1:? #6;"┌───┬───┬──┐"
YQ 680 POSITION 5,2:? #6;"│   │   │  │"
ZI 690 POSITION 5,3:? #6;"│   │   │  │"
JE 700 POSITION 5,4:? #6;"├───┼───┼──┤"
ZZ 710 POSITION 5,5:? #6;"│   │   │  │"
AR 720 POSITION 5,6:? #6;"│   │   │  │"
LG 730 POSITION 5,7:? #6;"├───┼───┼──┤"
CB 740 POSITION 5,8:? #6;"│   │   │  │"
CT 750 POSITION 5,9:? #6;"│   │   │  │"
PG 760 POSITION 5,10:? #6;"└───┴───┴──┘"
NO 770 POSITION 0,11:? #6;"press start fo
   r menu";
RI 780 REM
WO 790 REM *** GRID POSITION SELECTOR ***
QT 800 REM
EA 810 IF TEST THEN SPNEW=STICK(0):GOTO 8
   40
GK 820 SPNEW=INT(RND(0)*14+1)
QI 830 IF SPNEW=SPOLD THEN GOTO 820
XW 840 ON SPNEW GOTO 820,820,820,820,860,
   980,1100,820,1220,1340,1460,820,1580,1
   700,1820
RD 850 REM
GL 860 REM *** LOWER-RIGHT ***
SL 870 POSITION 12,8:? #6;"▩▩";
TE 880 POSITION 12,9:? #6;"▩▩";
XY 890 GOSUB 1950
CP 900 SETCOLOR 3,4,6+6*(1-STRIG(0))
QY 910 IF  NOT TEST THEN 940
YK 920 IF STICK(0)=5 THEN 900
QZ 930 GOTO 950
RW 940 GOSUB 2010
GQ 950 POSITION 12,8:? #6;"  ";
HJ 960 POSITION 12,9:? #6;"  ";
PF 970 GOTO 810
HQ 980 REM *** UPPER-RIGHT ***
OS 990 POSITION 12,2:? #6;"▩▩";
FK 1000 POSITION 12,3:? #6;"▩▩";
DR 1010 GOSUB 1950
ZT 1020 SETCOLOR 3,4,6+6*(1-STRIG(0))
RB 1030 IF  NOT TEST THEN 1060
AO 1040 IF STICK(0)=6 THEN 1020
QQ 1050 GOTO 1070
YB 1060 GOSUB 2010
LF 1070 POSITION 12,2:? #6;"  ";
MA 1080 POSITION 12,3:? #6;"  ";
RE 1090 GOTO 810
GR 1100 REM *** RIGHT ***
GZ 1110 POSITION 12,5:? #6;"▩▩";
HU 1120 POSITION 12,6:? #6;"▩▩";
DZ 1130 GOSUB 1950
AB 1140 SETCOLOR 3,4,6+6*(1-STRIG(0))
UI 1150 IF  NOT TEST THEN 1180
EQ 1160 IF STICK(0)=7 THEN 1140
SK 1170 GOTO 1190
YJ 1180 GOSUB 2010
NP 1190 POSITION 12,5:? #6;"  ";
NI 1200 POSITION 12,6:? #6;"  ";
QK 1210 GOTO 810
MS 1220 REM *** LOWER-LEFT ***
CC 1230 POSITION 6,8:? #6;"▩▩";
CW 1240 POSITION 6,9:? #6;"▩▩";
EH 1250 GOSUB 1950
AJ 1260 SETCOLOR 3,4,6+6*(1-STRIG(0))
OO 1270 IF  NOT TEST THEN 1300
JK 1280 IF STICK(0)=9 THEN 1260
PQ 1290 GOTO 1310
XP 1300 GOSUB 2010
QG 1310 POSITION 6,8:? #6;"  ";
RA 1320 POSITION 6,9:? #6;"  ";
QS 1330 GOTO 810
OD 1340 REM *** UPPER-LEFT ***
YM 1350 POSITION 6,2:? #6;"▩▩";
ZG 1360 POSITION 6,3:? #6;"▩▩";
EP 1370 GOSUB 1950
AR 1380 SETCOLOR 3,4,6+6*(1-STRIG(0))
RV 1390 IF  NOT TEST THEN 1420
LF 1400 IF STICK(0)=10 THEN 1380
QI 1410 GOTO 1430
XX 1420 GOSUB 2010
MQ 1430 POSITION 6,2:? #6;"  ";
NK 1440 POSITION 6,3:? #6;"  ";
RA 1450 GOTO 810
XB 1460 REM *** LEFT ***
AT 1470 POSITION 6,5:? #6;"▩▩";
BN 1480 POSITION 6,6:? #6;"▩▩";
EX 1490 GOSUB 1950
ZX 1500 SETCOLOR 3,4,6+6*(1-STRIG(0))
UA 1510 IF  NOT TEST THEN 1540
FS 1520 IF STICK(0)=11 THEN 1500
SC 1530 GOTO 1550
YF 1540 GOSUB 2010
OX 1550 POSITION 6,5:? #6;"  ";
PR 1560 POSITION 6,6:? #6;"  ";
RI 1570 GOTO 810
FJ 1580 REM *** DOWN ***
ET 1590 POSITION 9,8:? #6;"▩▩";
EL 1600 POSITION 9,9:? #6;"▩▩";
ED 1610 GOSUB 1950
AF 1620 SETCOLOR 3,4,6+6*(1-STRIG(0))
XH 1630 IF  NOT TEST THEN 1660
KR 1640 IF STICK(0)=13 THEN 1620
TW 1650 GOTO 1670
YN 1660 GOSUB 2010
SX 1670 POSITION 9,8:? #6;"  ";
TR 1680 POSITION 9,9:? #6;"  ";
RQ 1690 GOTO 810
BQ 1700 REM *** UP ***
AB 1710 POSITION 9,2:? #6;"▩▩";
AV 1720 POSITION 9,3:? #6;"▩▩";
EL 1730 GOSUB 1950
AN 1740 SETCOLOR 3,4,6+6*(1-STRIG(0))
AO 1750 IF  NOT TEST THEN 1780
OX 1760 IF STICK(0)=14 THEN 1740
VQ 1770 GOTO 1790
YV 1780 GOSUB 2010
PH 1790 POSITION 9,2:? #6;"  ";
OZ 1800 POSITION 9,3:? #6;"  ";
QW 1810 GOTO 810
GE 1820 REM *** NEUTRAL ***
CI 1830 POSITION 9,5:? #6;"▩▩";
DC 1840 POSITION 9,6:? #6;"▩▩";
AS 1850 SETCOLOR 3,4,6+6*(1-STRIG(0))
XJ 1860 IF PEEK(53279)=6 THEN 190
RY 1870 IF STICK(0)=15 THEN 1850
RF 1880 POSITION 9,5:? #6;"  ";
NU 1900 SETCOLOR 3,4,6
QY 1910 GOTO 810
IU 1920 REM
ZH 1930 REM *** BEEP & START TIMER ***
JA 1940 REM
UQ 1950 IF  NOT TEST THEN CNT=CNT+1:GRID(
   CNT)=SPNEW:IF CNT>CYCLES THEN 2340
GK 1960 SOUND 0,28,10,15:FOR X=0 TO 3:NEX
   T X:SOUND 0,0,0,0:POKE 19,0:POKE 20,0:
   RETURN
JJ 1970 REM
TU 1980 REM *** GET STICK RESPONSE ***
JP 1990 REM
WC 2000 IF PEEK(53279)=6 THEN 190
DZ 2010 IF STICK(0)=15 THEN 2000
RS 2020 STK=STICK(0):REM READ & DEBOUNCE
LV 2030 FOR X=1 TO DBTIME
XG 2040 IF STICK(0)<>STK THEN 2020
LO 2050 NEXT X
WT 2060 RTIME(CNT)=PEEK(19)*256+PEEK(20)
YG 2070 IF STK<>SPNEW THEN SOUND 0,40,6,1
```

continued on next page

```
   5:FOR X=1 TO 5:NEXT X:GOTO 2090
KF 2080 SOUND 0,30,10,15:FOR X=1 TO 3:NEX
   T X
LF 2090 SPOLD=SPNEW:RESPONSE(CNT)=STK
UU 2100 IF STICK(0)<>15 THEN 2100
HC 2110 SOUND 0,0,0,0
TM 2120 FOR X=1 TO 20:NEXT X:RETURN
II 2130 REM
UR 2140 REM *** PADDLE TESTER ***
IO 2150 REM
LV 2160 GRAPHICS 5:POKE 752,1:SETCOLOR 4,
   5,2:SETCOLOR 2,5,2
YC 2170 POKE 656,0:POKE 657,0:? "██████████
   ██████PADDLE█TESTER████████████████";
MN 2180 POKE 656,1:POKE 657,13:? "Yellow
   line ="
TN 2190 POKE 657,13:? "Green line  =";
IF 2200 POKE 656,3:POKE 657,10:? "Press S
   TART for menu";
KP 2210 COLOR 0:PLOT 0,13:XP=76-INT(PADDL
   E(0)/3):COLOR 1:DRAWTO XP,13:COLOR 0:P
   LOT XP,13:DRAWTO 76,13
DW 2220 COLOR 0:PLOT 0,26:XP=76-INT(PADDL
   E(1)/3):COLOR 2:DRAWTO XP,26:COLOR 0:P
   LOT XP,26:DRAWTO 76,26
FR 2230 POKE 656,1:POKE 657,27:? 228-PADD
   LE(0);"  ":POKE 657,27:? 228-PADDLE(1)
   ;"  ";
QJ 2240 SOUND 0,228-PADDLE(0),10,15
RX 2250 SOUND 1,228-PADDLE(1),10,15
GF 2260 IF  NOT PTRIG(0) THEN SETCOLOR 4,
   2,8:GOTO 2290
TF 2270 IF  NOT PTRIG(1) THEN SETCOLOR 4,
   12,10:GOTO 2290
MN 2280 SETCOLOR 4,5,2
CP 2290 IF PEEK(53279)=6 THEN SOUND 0,0,0
   ,0:SOUND 1,0,0,0:GOTO 190
OR 2300 GOTO 2210
IG 2310 REM
WP 2320 REM *** DISPLAY RESULTS ***
IM 2330 REM
UN 2340 GRAPHICS 2+16
YK 2350 ? :? "The evaluation is over. Her
   e are the"
XM 2360 ? "results for ";CYCLES;" iterati
   ons:"
XB 2370 FOR X=1 TO CYCLES
TS 2380 TEMP=GRID(X)
KC 2390 IF RESPONSE(X)=TEMP THEN 2420
JP 2400 MISS=MISS+1
HO 2410 IF TEMP=5 OR TEMP=6 OR TEMP=9 OR
   TEMP=10 THEN DMISS=DMISS+1
WS 2420 TTIME=TTIME+RTIME(X)
LQ 2430 NEXT X
YG 2440 ? :? "Overall accuracy = ";INT((C
   YCLES-MISS)/CYCLES*100);"%"
NW 2450 ? "Total error = ";INT(MISS/CYCLE
   S*100);"%"
GX 2460 ? "Horiz. & vert. error = ";INT((
   MISS-DMISS)/CYCLES*100);"%"
FW 2470 ? "Diagonal error = ";INT(DMISS/C
   YCLES*100);"%"
AN 2480 ? "Average response time = ";INT(
   (TTIME/CYCLES)/60*100)/100;" seconds"
DK 2490 GOSUB 2550
BE 2500 GRAPHICS 0
WH 2510 POSITION 0,0:? "████████████INDIVIDU
   AL█RESPONSES████████████"
DR 2520 ? "Cycle","Grid","Response","Time
   ":?
ZP 2530 FOR X=1 TO CYCLES:? X,GRID(X),RES
   PONSE(X),INT(RTIME(X)/60*100)/100:NEXT
    X
HX 2540 GOSUB 2550:GOTO 190
VL 2550 ? :? "Press joystick TRIGGER to c
   ontinue."
YQ 2560 IF STRIG(0) THEN 2560
BF 2570 RETURN
```

SUPER RAMDISK FOR ALL XL/XE MEMORY UPGRADES

SMARTRAM 2.5

Article on page 15

LISTING 1

Don't type the TYPO II Codes!

```
IJ 10 REM RAMDISK.BAS
PH 20 REM BY TIM PATRICK
GX 30 REM (c) 1985,1989 ANTIC PUBLISHING
EV 40 REM (LINES 10-250 MAY BE USED WITH
   OTHER BASIC LOADERS IN THIS ISSUE.
IJ 50 REM CHANGE LINE 70 AS NECESSARY.)
PR 60 DIM FN$(20),TEMP$(20),AR$(93):DPL=P
   EEK(10592):POKE 10592,255
UM 70 FN$="D:RAMDISK.COM":REM THIS IS THE
    NAME OF THE DISK FILE TO BE CREATED
RD 80 ? "◙Disk or Cassette?";:POKE 764,25
   5
PY 90 IF  NOT (PEEK(764)=18 OR PEEK(764)=
   58) THEN 90
TH 100 IF PEEK(764)=18 THEN FN$="C:"
VB 110 POKE 764,255:GRAPHICS 0:? "      AN
   TIC'S GENERIC BASIC LOADER"
MY 120 ? ,"BY CHARLES JACKSON"
KB 130 POKE 10592,DPL:TRAP 200
PU 140 ? :? :? "Creating ";FN$:? "...plea
   se stand by."
LW 150 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BQ 160 AR$="":READ AR$
YC 170 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DM 180 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")     "
BK 190 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 160
MM 200 IF PEEK(195)=5 THEN ? :? :? "◙TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
CM 210 IF C<LN+1 THEN ? :? "◙TOO FEW DATA
    LINES!":? "CANNOT CREATE FILE!":END
UQ 220 IF FN$="C:" THEN ? :? " Prepare ca
   ssette, press [RETURN]"
AR 230 OPEN #1,8,0,FN$
PV 240 POKE 766,1:? #1;A$;:POKE 766,0
AL 250 CLOSE #1:GRAPHICS 0:? "█COMPLETED█
   "
NC 1000 DATA 958
TK 1010 DATA 255255000048177051173001211O
   092520721701721730510322360500160021O4
   0961741560510322360501411 77
XD 1020 DATA 051174160051032236050048O182
   381770512080351620031891690511571560 51
   20201624704801917416505 1032
XK 1030 DATA 236050048014162003189165051 1
   571600512020162472381770511041410012 11
   1731770512400360160371 60202
ZG 1040 DATA 1402180482382260481600031402
   370481851730511531560511851150481530 51
   05113601624104801006807 3083
VW 1050 DATA 0750322140500320580501690081
   7014112800714113701114109501602410504 8
   14115305114104905114111 2049
XY 1060 DATA 1412140491690000560422022082
   5201301000714101000703222400716202516 0
   05116907914107200314206 8003
DN 1070 DATA 1400690031620001420730031690
   1114106600303208622816200217300121107 2
   00925206115605114100121 1160
BT 1080 DATA 0002360001162400012002322360
   0211624000120016224223600111624000120 0
```

```
   |1522400661620071730012110 09
IS |1090 DATA 25206115605114100121116206 41
   |34051160000132050152145050200208251230
   |0512022082462062370480162 19
HC |1100 DATA 03204805016925415706600316 91
   |52157068003169051157069003169000157075
   |0031570740030320862281041 41
VJ |1110 DATA 00121103204805016900315706 60
   |03169004157074003169130157068003169051
   |1570690030320862280480281 69
JB |1120 DATA 00715706600316900615707200 31
   |69020157073003169179157068003169051157
   |0690030320862280480340320 48
FR |1130 DATA 05016905614113105114114205 11
   |69003157066003169008157074003169130157
   |068003169051157069003032086
CE |1140 DATA 22804802816901115706600316 90
   |06157072003169020157073003169179157068
   |0031690511570690030320862 28
KA |1150 DATA 04810003204805017325000320 80
   |05173248003208023169003157066003169008
   |1570740031691411570680031 69
NG |1160 DATA 05115706900303208622803204 80
   |50169056141063021173177051048081169003
   |1570660031690121570740031 69
IU |1170 DATA 13015706800316905115706900 30
   |32086228169007157066003169048157072003
   |1690001570730031691791570 68
XU |1180 DATA 00316905115706900303208622 80
   |48028169011157066003169026157072003169
   |0001570730031691041570680 03
HO |1190 DATA 16905115706900303208622816 20
   |64169012157066003076086228169009141142
   |0201690651411490201600101 85
IK |1200 DATA 14205015322201813601624716 00
   |19185153050153196020136016247160008185
   |1560511530990241360162471 69
IK |1210 DATA 09914123101816902414123201 81
   |73195023024105002141202023160040185173
   |0501530580241360162471691 38
EG |1220 DATA 14109301616900614113501109 60
   |41007168173001211009252057156051173001
   |2110092521410012111601921 40
PS |1230 DATA 01421216000013206608820009 62
   |53155028069082082079082032087082073084
   |0730780710320770690770460 83
HE |1240 DATA 06508603204503208903208407 90
   |32082085078032068079083033155160003185
   |1730511531600511852320501 53
GR |1250 DATA 11705113601624109617718517 82
   |03140001211173000064072142001211205000
   |0642080191400012110732551 41
XY |1260 DATA 00006414200121120500006420 80
   |03162255252162000140001211104141000064
   |1380961250280280831090971 14
NP |1270 DATA 11608206507704507307303206 80
   |79083032050046053032068056058049048053
   |0480320690770850760650840 79
SX |1280 DATA 08215509812103208410510903 20
   |80097116114105099107044032067079080089
   |0820730710720840320490570 56
TR |1290 DATA 05703206507808407306703103 10
   |29205207196201198201197196160198207210
   |1601781811822031602051931 95
XT |1300 DATA 20020120619716106804905806 80
   |85080046083089083155068056058077069077
   |0460830650861550680560581 55
VH |1310 DATA 16316717117519519920320725 50
   |99103107111131135139143227231235239000
   |224002225002000048
```

EASY TEXT SCREEN DUMPS—JUST LIKE A PC

ATARI PRINT SCREEN

Article on page 26

LISTING 1

Don't type the TYPO II Codes!

```
CB |10 REM PRTSCRN BY STEVE DERDERIAN
GD |30 REM (c) 1985,1988 ANTIC PUBLISHING
EV |40 REM (LINES 10-250 MAY BE USED WITH
   |OTHER BASIC LOADERS IN THIS ISSUE.
IJ |50 REM CHANGE LINE 70 AS NECESSARY.)
PR |60 DIM FN$(20),TEMP$(20),AR$(93):DPL=P
   |EEK(10592):POKE 10592,255
PF |70 FN$="D1:PRTSCRN.EXE":REM THIS IS TH
   |E NAME OF THE DISK FILE TO BE CREATED
RD |80 ? "Disk or Cassette?";:POKE 764,25
   |5
PY |90 IF  NOT (PEEK(764)=18 OR PEEK(764)=
   |58) THEN 90
TH |100 IF PEEK(764)=18 THEN FN$="C:"
VB |110 POKE 764,255:GRAPHICS 0:? "      AN
   |TIC'S GENERIC BASIC LOADER"
MY |120 ? ,"BY CHARLES JACKSON"
KB |130 POKE 10592,DPL:TRAP 200
PU |140 ? :? :? "Creating ";FN$:? "...plea
   |se stand by."
LW |150 RESTORE :READ LN:LM=LN:DIM A$(LN):
   |C=1
BQ |160 AR$="":READ AR$
YC |170 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   |2,255
DM |180 LM=LM-1:POSITION 10,10:? "(Countdo
   |wn...T-";INT(LM/10);")      "
BK |190 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   |1:NEXT X:GOTO 160
MM |200 IF PEEK(195)=5 THEN ? :? :? "TOO
   |MANY DATA LINES!":? "CANNOT CREATE FIL
   |E!":END
CM |210 IF C<LN+1 THEN ? :? "TOO FEW DATA
   | LINES!":? "CANNOT CREATE FILE!":END
UQ |220 IF FN$="C:" THEN ? :? " Prepare ca
   |ssette, press [RETURN]"
AR |230 OPEN #1,8,0,FN$
PV |240 POKE 766,1:? #1;A$;:POKE 766,0
AL |250 CLOSE #1:GRAPHICS 0:? "COMPLETED
   |"
GD |1000 DATA 412
TU |1010 DATA 25525500006425106416200018 90
   |26003201080240005232232232208244189027
   |0031332031890280031332041 60
EC |1020 DATA 00617720317020017720316823 22
   |08001200142004065142027065140005065140
   |0280651730080021411910641 73
AY |1030 DATA 00900214119206416501214114 50
   |64165013141146064174231002172232002232
   |2080012001341761321771421 48
OS |1040 DATA 06414015006402413810503914 11
   |73064152105000141175064024138105210141
   |2400641521050001412410640 24
RV |1050 DATA 13810517814124406415210500 01
   |41245064160213185144064145176136192255
   |2082462400030322552551622 55
MY |1060 DATA 16025513401213201302417323 10
   |02105215141231002173232002105000141232
   |0021622551602551420080021 40
CV |1070 DATA 00900209617300921020120224 00
   |03076255255138072152072165016072041063
   |1330161410142100881690001 33
EL |1080 DATA 20316919113320416900313320 51
   |69040133206164203177088072042042042042
   |0410031701040410310292552 55
FT |1090 DATA 17018925525522403214400713 82
   |01252064139065124208002169179162000032
   |2552552302032080022300891 98
LV |1100 DATA 20420800219820519820620800 71
   |69155162000322552551652040372052012 55
   |2400061652062081832401771 98
```

continued on next page

```
HY 1110 DATA 0891980891980891692551410092
   10104133016141014210104168104170104064
   224195225188180183047092226
CG 1120 DATA 2272282292302312322332342011
   96197235236237194208238192168239240241
   242032064000096080082084083
HL 1130 DATA 0670820780320860690820830730
   79078032049046051032040067041032065078
   084073067032077065071065090
WC 1140 DATA 073078069224002225002000064
```

LISTING 2

```
1000 **********************************
******
1010 * ATARI PRINTSCREEN
     *
1020 * This program was written using
     *
1030 * MAC65.  By Steve Derderian
     *
1040 * (c) 1989 ANTIC PUBLISHING, INC.
     *
1050 * Date Written:  November 2, 1988
     *
1060 *
     *
1070 **********************************
******
1080 *
1090 START = $4000    ;Initial load add
ress for the program
1100 DOSINI = $0C     ;Vector to the DO
S initialization routine
1110 POKMSK = $10     ;Interupt request
 enable shadow register
1120 SAVMSC = $58     ;Pointer to scree
n RAM
1130 ZMEMLO = $B0     ;Work area used b
y relocation section
1140 C0  =   $CB      ;Work areas used
by print screen section
1150 C1  =   $CC      ;Data residing be
tween $CB and $CE will
1160 C2  =   $CE      ;be destroyed whe
n print screen is used
1170 VKEYBD = $0208  ;Vector to the ke
yboard interupt routine
1180 RUNAD = $02E0    ;DOS run after lo
ad
1190 MEMLO = $02E7    ;Everyone knows M
EMLO
1200 HATABS = $031A   ;Device handler a
ddress table
1210 KBCODE = $D209   ;KBCODE is the re
gister used to store a key press
1220 IRQEN = $D20E    ;The real interup
t request enable register
1230 *
1240       *=  START
1250 **********************************
******
1260 *
     *
1270 * This program consists of three
     *
1280 * sections.  The first section is
     *
1290 * responsible for loading the pro
gram
1300 * at START ($4000), modifying the
     *
1310 * rest of the program to run at L
OMEM *
1320 * (actual address unknown until r
un   *
1330 * time), and moving the program t
o    *
1340 * LOMEM.
     *
1350 *
     *
1360 * The following section of the
     *
1370 * program is not moved to LOMEM s
o it *
1380 * does not take up any memory in
your *
1390 * computer.
     *
1400 *
     *
1410 **********************************
******
1420 *
1430       LDX #0         ;Search the handl
er
1440 P01  LDA HATABS,X ;address table l
ooking
1450       CMP #'P        ;for the printer
1460       BEQ P02        ;device handler.
1470       INX            ;Each handler ent
ry
1480       INX            ;consists of thre
e
1490       INX            ;bytes.
1500       BNE P01        ;Not found, try a
gain.
1510 *
1520 P02  LDA HATABS+1,X ;Found P:.
1530       STA C0+0       ;Move the address
 of the
1540       LDA HATABS+2,X ;P: vector tab
le to
1550       STA C0+1       ;page 0.
1560 *
1570       LDY #6         ;Pick up the addr
ess of
1580       LDA (C0),Y     ;the P: put byte
routine.
1590       TAX
1600       INY
1610       LDA (C0),Y
1620       TAY
1630       INX            ;The table contai
ns the address
1640       BNE P03        ;of the routine m
inus 1.
1650       INY            ;Add 1 to so we c
an do a JSR.
1660 *
1670 P03  STX P17+1      ;Store the addres
s of the
1680       STX P20+1      ;put byte routine
 in
1690       STY P17+2      ;section three of
 the
1700       STY P20+2      ;program.
1710 *
1720       LDA VKEYBD+0 ;Save the addres
s of
1730       STA P10+1      ;the current keyb
oard
1740       LDA VKEYBD+1 ;interupt routin
e.
1750       STA P10+2
1760 *
1770       LDA DOSINI+0 ;Save the addres
s of
1780       STA P06+1      ;the current DOS
reset
1790       LDA DOSINI+1 ;routine.
1800       STA P06+2
1810 *
1820       LDX MEMLO+0 ;MEMLO points to
the last byte
1830       LDY MEMLO+1 ;used by DOS.  We
 need to add
1840       INX            ;1 to MEMLO so we
don't step
1850       BNE P04        ;on that byte.
1860       INY
1870 P04  STX ZMEMLO+0 ;Stash the addre
ss for
1880       STY ZMEMLO+1 ;use later.
1890       STX P07+1      ;Section two of t
his program
1900       STY P07+3      ;also needs to re
member MEMLO.
1910 *
1920       CLC            ;Add MEMLO to the
 relative address
1930       TXA            ;of the print scr
een routine
1940       ADC # <P09-P06 ;(section thre
e) so that
1950       STA P08+1      ;we can calculate
 its
1960       TYA            ;absolute address
.
1970       ADC # >P09-P06
```

```
1980      STA P08+3
1990 *
2000      CLC           ;Add MEMLO to the
 relative address
2010      TXA           ;of the internal
to atascii
2020      ADC # <INTATA-P06 ;conversion
 table
2030      STA P14+1     ;so we can calcul
ate its
2040      TYA           ;absolute address
.
2050      ADC # >INTATA-P06
2060      STA P14+2
2070 *
2080      CLC           ;Add MEMLO to the
 relative address
2090      TXA           ;of the printer c
ode
2100      ADC # <OUTTBL-P06 ;conversion
 table
2110      STA P15+1     ;so we can calcul
ate its
2120      TYA           ;absolute address

2130      ADC # >OUTTBL-P06
2140      STA P15+2
2150 *
2160      LDY #PGMEND-P06-1 ;Move secti
ons two and
2170 P05  LDA P06,Y     ;three down to ME
MLO.
2180      STA (ZMEMLO),Y
2190      DEY
2200      CPY #$FF
2210      BNE P05
2220      BEQ P07       ;UNCONDITIONAL SK
IP. 1ST TIME ONLY.
2230 *
2240 **********************************
******
2250 *
     *
2260 * This is section two.  It is
     *
2270 * responsible for protecting our
     *
2280 * program and installing (and
     *
2290 * reinstalling) the print screen
     *
2300 * program each time the system re
set  *
2310 * button is pressed.
     *
2320 *
     *
2330 * This section (except for the fi
rst  *
2340 * JSR) is also performed when the
     *
2350 * program is initially loaded fro
m    *
2360 * DOS.
     *
2370 *
     *
2380 **********************************
******
2390 *
2400 P06  JSR $FFFF     ;Call the old DOS
 initialization routine.
2410 *
2420 P07  LDX #$FF      ;Change the DOS i
nitialization routine
2430      LDY #$FF      ;vector to point
to our
2440      STX DOSINI+0 ;initialization
routine.
2450      STY DOSINI+1
2460 *
2470      CLC           ;Raise MEMLO so t
hat our program is
2480      LDA MEMLO+0 ;protected.
2490      ADC # <PGMEND-P06+1
2500      STA MEMLO+0
2510      LDA MEMLO+1
2520      ADC # >PGMEND-P06+1
2530      STA MEMLO+1
2540 *
2550 P08  LDX #$FF      ;Change the keybo
ard interupt
2560      LDY #$FF      ;vector to point
to
2570      STX VKEYBD+0 ;our interupt ha
ndler
2580      STY VKEYBD+1 ;(section three)
.
2590 *
2600      RTS           ;Return to DOS (o
r the OS if system reset).
2610 *
2620 **********************************
******
2630 *
     *
2640 * This is section three.  It is t
he   *
2650 * part of the program that actual
ly   *
2660 * performs the screen print funct
ion. *
2670 * (This is why we did all of that
     *
2680 * stuff above.)
     *
2690 *
     *
2700 * This section is called each tim
e a  *
2710 * key is pressed.
     *
2720 *
     *
2730 **********************************
******
2740 *
2750 P09  LDA KBCODE    ;Pick up the code
 from the keyboard register.
2760      CMP #$CA      ;Was it <SHIFT><C
ONTROL>P?
2770      BEQ P11       ;YES!
2780 *
2790 P10  JMP $FFFF     ;NO! - Let the OS
 handle it.
2800 *
2810 P11  TXA           ;Since this is an
 interupt routine
2820      PHA           ;we are responsib
le for saving
2830      TYA           ;all of the regis
ters. (The
2840      PHA           ;A-register was s
aved by the OS.)
2850      LDA POKMSK    ;We don't have to
 do this, but
2860      PHA           ;we want to save
POKMSK too.
2870 *
2880      AND #$3F      ;0011 1111 Turn o
ff keyboard and
2890      STA POKMSK    ;break key interu
pts.
2900      STA IRQEN
2905      CLI           ;Allow SIO Interr
upts...
2910 *
2920      LDA #0        ;C0 holds the ind
ex into screen RAM.
2930      STA C0
2940 *
2950      LDA # <959    ;C1 holds the cou
nter used
2960      STA C1+0      ;to tell us when
we have
2970      LDA # >959    ;finished coping
all 960
2980      STA C1+1      ;bytes from the s
creen to the printer.
2990 *
3000 P12  LDA #40       ;C2 counts from 4
0 to 0.
3010      STA C2        ;When it hits 0,
we do a printer line feed.
3020 *
3030 P13  LDY C0        ;Recall the index
.
3040      LDA (SAVMSC),Y ;Pick up the s
creen character.
3050      PHA           ;Convert it from
```

continued on next page

```
internal code
3060      ROL A        ;to ATASCII.  (Tr
ust me.)
3070      ROL A
3080      ROL A
3090      ROL A
3100      AND #3
3110      TAX
3120      PLA
3130      AND #$1F
3140 P14  ORA $FFFF,X
3150      TAX
3160 P15  LDA $FFFF,X ;Pick up the equi
livant printer character.
3170      CPX #'       ;Was the characte
r < a space?
3180      BCC P16      ;YES!
3190      TXA          ;NO! - bring it b
ack.  It was OK before.
3200      CMP #'|      ;Virgule?
3210      BNE P16      ;NO! - print it
3220      LDA #$B3     ;YES! - change to
 solid
3230 *
3240 P16  LDX #0       ;For XL/XE machin
es.
3250 P17  JSR $FFFF    ;Print the charac
ter.
3260 *
3270      INC C0       ;NO! - Increment
our screen index.
3280      BNE P18      ;If the index rol
ls from $FF to $00,
3290      INC SAVMSC+1 ;increment the s
creen address.
3300 *
3310 P18  DEC C1+0     ;Decrement our 96
0 counter.
3320      BNE P19
3330      DEC C1+1
3340 *
3350 P19  DEC C2       ;Decrement our 40
 counter
3360      BNE P21      ;It's not zero.
Aren't we done yet?
3370 *
3380      LDA #$9B     ;It was zero, do
a line feed.
3390      LDX #0       ;For XL/XE machin
es.
3400 P20  JSR $FFFF    ;Print the charac
ter.
3410 *
3420 P21  LDA C1+0
3430      AND C1+1
3440      CMP #$FF     ;Did we hit -1?
3450      BEQ P22      ;YES! - We're alm
ost done.
3460 *
3470      LDA C2
3480      BNE P13      ;Haven't filled a
 line yet
3490      BEQ P12      ;UNCONDITIONAL -
reset the 40 counter.
3500 *
3510 P22  DEC SAVMSC+1 ;Restore the poi
nter
3520      DEC SAVMSC+1 ;to screen RAM.
3530      DEC SAVMSC+1
3540 *
3550      LDA #$FF     ;Clear the key pr
ess so
3560      STA KBCODE   ;we don't get stu
ck in a loop.
3570 *
3580      PLA          ;Restore the inte
rupt
3590      STA POKMSK   ;request register
.
3600      STA IRQEN
3610      PLA          ;Restore the CPU
registers.
3620      TAY
3630      PLA
3640      TAX
3650      PLA
3660      RTI          ;Return from the
interupt.
3670 *
3680 ********************************
******
3690 *
     *
3700 * The following table is used to
     *
3710 * convert the ATASCII graphics
     *
3720 * character to the equilivant
     *
3730 * IBM printer character.  If you
have *
3740 * Panasonic, Epson, or any other
     *
3750 * printer that supports IBM graph
ics  *
3760 * characters, this should work fi
ne.  *
3770 * The table will also protect you
     *
3780 * from the escape or other printe
r    *
3790 * control characters.
     *
3800 *
     *
3810 * If this program does not work
     *
3820 * properly with your printer, you
 may *
3830 * have to modify this table.
     *
3840 *
     *
3850 ********************************
******
3860 OUTTBL .BYTE "◆Cak47/\bcdefghijI0
E"
3870        .BYTE "kIMBPnecopqr"
3880 *
3890 ********************************
******
3900 *
     *
3910 * The following table is used to
     *
3920 * convert screen characters to
     *
3930 * ATASCII characters.  DON'T CHAN
GE   *
3940 * IT.
     *
3950 *
     *
3960 ********************************
******
3970 INTATA .BYTE $20,$40,$00,$60
3980 *
3990 ********************************
******
4000 *
     *
4010 * The following message places th
e    *
4020 * program name and version number
 in  *
4030 * the object code created by the
     *
4040 * Assembler.  This is so you can
see  *
4050 * if you are running an old versi
on   *
4060 * of the program.
     *
4070 *
     *
4080 * This message is not copied down
 to  *
4090 * LOMEM after the program is load
ed   *
4100 * so it will not take up any extr
a    *
4110 * memory in your computer.
     *
4120 *
     *
4130 ********************************
******
4140 PGMEND .BYTE "PRTSCRN VERSION 1.3
 (C) ANTIC MAGAZINE"
4150      *=  RUNAD
4160      .WORD START ;Tell DOS to run
the program
```

Tech Tips

BIGGER 130XE RAMDISKS

By Charles Jackson

30XE owners have many reasons to appreciate DOS 2.5's 412-sector RAMdisk. It lets you save files *quickly*, it's reliable, and automatically installs its own copies of the DUP.SYS and MEM.SAV files, giving you *instant* access to the DOS menu. Since DUP.SYS is in D8:, your RAMdisk, you don't have to wait for it to load from drive 1.

You can get a 499-sector RAMdisk if you erase the DUP.SYS and MEM.SAV files. This will give you 87 more sectors. Unfortunately, you won't be able to get to the DOS menu anymore because your Atari will be looking for it on D8:, your RAMdisk. Every time you type DOS, your Atari will check your RAMdisk for a DUP.SYS file (the one you erased) and return you to a READY prompt.

Here's how to make BASIC look for DUP.SYS in drive 1.

```
POKE 5439, ASC("1")
```

You can make BASIC look for DUP.SYS in any other drive by placing the ASCII value of the drive number into memory location 5439 ($153F). POKE 5439,ASC("2") will make DOS look in drive 2.

Now you can erase DUP.SYS and MEM.SAV from your RAMdisk, giving you 87 more sectors, and you'll *still* be able to get a DOS menu. Just make sure you have DUP.SYS on a floppy disk!

KEYBOARD INPUT CHECKER

By Arnold Putong

Error trapping and checking keyboard input can be a big hassle in BASIC. By using PEEK(764) to verify the input, you can eliminate complicated IF-THEN sequences. Location 764 holds a numeric value for the last key pressed —it is not an ASCII code.

The following short program will allow you to determine which value is associated with each key on the keyboard. Note—*three spaces are required* between the final quotation marks in line 20.

```
10 GRAPHICS 18:POKE 16,64:POKE 53774,64
20 POKE 752,1:? #6;" ":POSITION 8,5:?
#6;PEEK(764);"   ":GOTO 20
```

RUN the program and try pressing a key. The key's value will be printed on the screen. You can also see the combined values you get using the [CONTROL] or [SHIFT] keys.

Once you know the value of the keystrokes your program is looking for, you can use statements such as:

```
IF PEEK(764) = 27 THEN . . .
```

DOCFILE QUICKPRINT

By Frank Jersawitz

Need a quick way to print documentation files either to the screen or the printer? You could use any of the many fine programs available, such as *Two-Column Print Pro* from the June 1989 **Antic**.

However, if you don't want to bother with other programs, there's an easy way to print your files from DOS. Simply use DOS option [C], COPY FILE. First make sure your printer is turned on! When DOS prompts you for file names, just type:

```
D:FILENAME.EXT,P:
```

The file will be printed. Replace P: with S: and your file will be displayed on the screen. To stop the scrolling so you can read the file, press [CONTROL][1]. Press this key combination again to resume scrolling.

IMPROVED TRIGGER RESPONSE

By James Hague

In many BASIC programs, especially games with long main loops, the user could press the joystick button so fast that the program misses it completely. There is a way to have the computer "remember" when the button is pressed, even after it is released. When the program finally gets around to checking the button's status, it seems as if it's still pressed. The key is the following command:

```
POKE 53277,4
```

Use this command *before* you start executing your main loop (that is, just once before the loop is entered). Then, after you have detected a button press and reacted to it, you will need to use this command again to clear the button. If you are using Player/Missile Graphics in your program, change the 4 to a 7.

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